

**Epidemiological Profile of Reported Tuberculosis
in Tennessee
2004**



**Tennessee Department of Health
Tuberculosis Elimination Program
2004**

Epidemiological Profile of Reported Tuberculosis in Tennessee 2004



Tennessee Department of Health Tuberculosis Elimination Program 2004

November 2005

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Epidemiological Profile of Reported Tuberculosis in Tennessee
Tennessee Department of Health
TB Elimination Program

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TUBERCULOSIS ELIMINATION PROGRAM
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November 1, 2005

This publication, *Epidemiological Profile of Reported Tuberculosis in Tennessee, 2004* provides descriptive information regarding the statewide epidemiology of reported cases of tuberculosis (TB) in Tennessee, as well as comparative data for Tennessee's regional health jurisdictions. Among Tennessee's health jurisdictions are seven rural regions and six metropolitan regions. Included in this report are tables and discussion describing the morbidity and mortality of tuberculosis cases reported in 2004 in the State of Tennessee, as well as demographics, risk factors, and clinical management of reported tuberculosis cases at both state and regional levels. Also included is a brief discussion regarding two programs that significantly impact current public health practice and the future of tuberculosis control both locally and nationally: the Tuberculosis Epidemiologic Studies Consortium (TBESC) and Universal Genotyping. A complete slide set has been provided and is to be used in conjunction with the mentioned tables and discussion for a more comprehensive understanding of the burden of tuberculosis disease within the State of Tennessee, and its regional health jurisdictions.

Reports of TB cases are submitted to the Tennessee Tuberculosis Elimination Program by local, metropolitan, and regional health departments, as well as private providers, hospitals, and other health care facilities in the state. Data described in this report reflects TB cases reported by the health jurisdictions using Tuberculosis Information Management System (TIMS) as of July 14, 2005. Adherence to the reporting guidelines and definitions as given in the RVCT Form Completion Instructions is assumed.

Recognition and thanks are extended to the Tennessee Department of Health TB Elimination Program field staff, central office staff, local, regional and metropolitan health departments, The Centers for Disease Control and Prevention, and the American Lung Association of Tennessee for their contributions and support in controlling TB in the state.

Sincerely,

Jon Warkentin, MD, MPH
Tuberculosis Control Officer

TTBEP Program Description

The Tennessee Tuberculosis Elimination Program (TTBEP) operates within the Tennessee Department of Health, Bureau of Health Services, Communicable and Environmental Disease Services Section. The Central Office of the TTBEP has the overall responsibility for TB control throughout the state as well as ensuring efficient and effective surveillance, diagnostic, treatment, and prevention services. The central TTBEP office provides oversight, guidance, education, and training to the State's thirteen health jurisdictions (six metropolitan county health departments and seven rural regional health departments serving multi-county areas).

TTBEP provides an array of services to the private medical community, as well as public and community-based agencies and stakeholders. These services include TB-related training and education, comprehensive diagnostic and treatment programs for patients with suspected or confirmed TB disease or Latent TB Infection (LTBI), investigation of close contacts to all reported TB cases, and screening high-risk groups to identify persons with LTBI or active disease.

Tennessee has adopted and built its program on three priority strategies for preventing and controlling TB, as recommended by the Advisory Council for the Elimination of Tuberculosis:

- 1) Identify and fully treat persons who have active TB disease (***Cases***).
- 2) Find and screen persons who are contacts to TB patients to determine if they are infected with *Mycobacterium tuberculosis* or have active TB and provide appropriate treatment (***Contacts***).
- 3) Screen populations at high risk for TB infection and disease to detect infected persons and provide Latent TB Infection (LTBI) therapy to prevent progression to active TB (***Targeted Testing Initiatives***).

Additional Programs

TBESC (Tuberculosis Epidemiologic Studies Consortium)

Tennessee is a member of the Tuberculosis Epidemiologic Studies Consortium (TBESC), which is a CDC-funded group that carries out epidemiologic research concerning TB. The goal of participation in TBESC studies is to improve TB services by gathering information that allows TB programs to better understand high-risk communities, training staff members in a variety of areas that support TB elimination, and developing new tools for the field that improve information collection. The TBESC is comprised of CDC, State/Metropolitan TB control programs, universities, hospitals, and non-profit organizations at 22 member sites in the US and Canada.

The studies, or task orders, are carried out at TBESC sites and are selected from concepts submitted by member sites and determined to be useful to TB Programs. Most task orders require competition for participation, but participation in some task orders is optional for all sites. CDC-funding provides for the research, so TBESC projects do not take away from TB program funds. The small number of sites that participate in these studies means that the research conducted in Tennessee has the potential to influence TB control practices across the country. To date, there are 17 studies underway or completed by TBESC sites. Tennessee is currently funded to participate in five studies: Task Order 2: Contact Investigation Study; Task Order 8: MDR-TB Genotyping; Task Order 9: Prevention of TB in the Foreign-Born; Task Order 11: Barriers to LTBI and TB Disease Treatment in the Southeastern U.S.; and Task Order 13: LTBI Treatment Acceptance and Adherence.

Current research through the TBESC provides both direct and long-term benefits to the State of Tennessee. TBESC research staff routinely support field staff by assisting with contact investigations and providing insight into the management of high-risk populations. Results of TBESC studies can be applied towards improved TB control and prevention practices.

Universal Genotyping

In March 2004, the Tennessee Department of Health began participating in the Nationwide Genotyping Program implemented by the CDC. Since that time, the initial isolate of all positive tuberculosis cultures in Tennessee have been sent for genotyping analysis; this is referred to as “Universal Genotyping”.

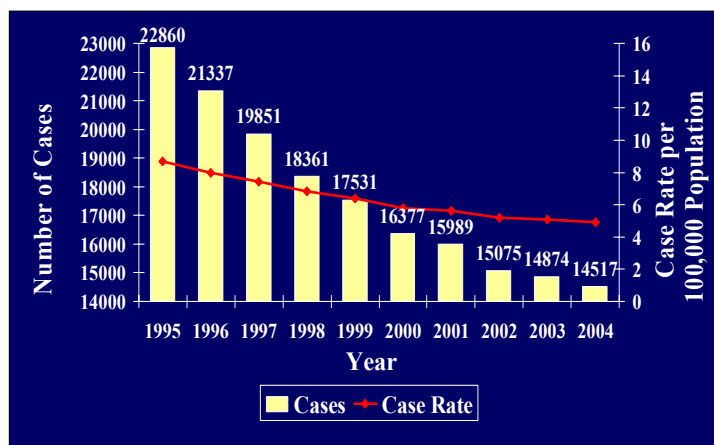
Genotyping is based on the analysis of DNA. Tuberculosis genotyping identifies genetic links between *M. tuberculosis complex* isolates from different TB patients. If two TB patients have matching genotypes, this indicates that the two patients may be involved in the same chain of recent transmission (TB transmission that has occurred within the previous two years).

TB genotyping has the potential to change how TB control is conducted in this country. By helping to identify TB patients who are involved in recent transmission, TB genotyping will enable earlier TB outbreak detections and intervention, as well as identification of nontraditional transmission settings.

Epidemiologic Summary of TB in the United States

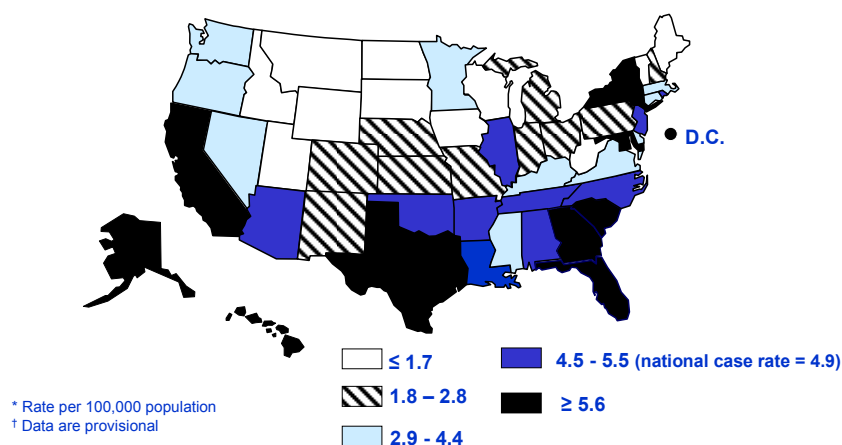
The United States has experienced a continued decrease in the incidence of reported tuberculosis disease since the mid 1990s, after having experienced a resurgence in the late 1980s and early 1990s. (See Figure 1.)

Figure 1. Tuberculosis Cases and Case Rates for the United States, 1995-2004



In 2004, the United States reported 14,517 cases of tuberculosis disease and a case rate of 4.9 cases per 100,000 population. This is the lowest case rate seen since the CDC started formally collecting tuberculosis case data in 1953, at which time the case rate was 52.6 cases per 100,000 population. As depicted in Figure 2, the incidence of TB disease reported in the United States in 2004 was largely concentrated in the Southeastern States, including the State of Tennessee.

FIGURE 2. Rate* of Tuberculosis Cases, by State: United States, 2004†



† Figure 1 and Figure 2 provided by the Centers for Disease Control and Prevention.

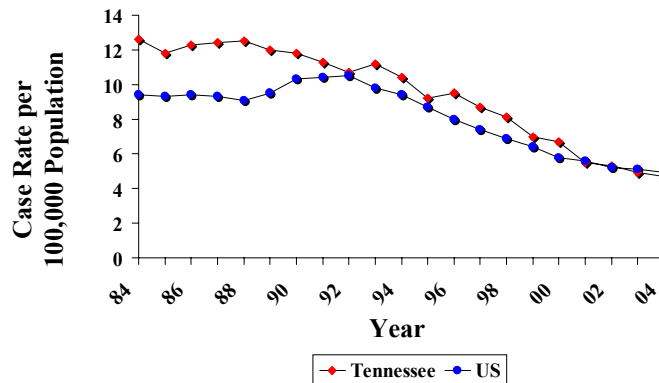
The United States has seen a steady increase in the proportion of cases reporting having been born in a country other than the United States, known as foreign-born. Between 2000 and 2004, the proportion of foreign-born cases increased from 46% to 53%, thus indicating a continued need for tuberculosis surveillance, prevention programs, and the facilitation of targeted testing programs in states with an increased disease incidence in their foreign-born population.

TB Morbidity

TB Morbidity

In 2004, the State of Tennessee reported having 277 cases of TB, ranking Tennessee 13th in the nation for the total incidence of TB (the case definitions and reporting guidelines can be found in Appendix 1 and 2, respectively). The State of Tennessee reported a case rate for 2004 of 4.7 cases per 100,000 population, which is lower than the national case rate of 4.9 cases per 100,000. As Figure 3 demonstrates, the State of Tennessee reported a case rate lower than that of the nation in 2001, and has continued to report a lower case rate ever since.

**Figure 3. Tuberculosis Case Rates
Tennessee and United States, 1984-2004**



Several regional health jurisdictions experienced a similar decline. For example, Jackson/Madison County, Mid Cumberland Region, Nashville/Davidson County, South Central Region, East Tennessee Region, Knoxville/Knox County, and North East Region all experienced a decrease in their case rate of TB disease. On the other hand, other reporting areas saw an increase in the proportion of TB disease burden. For example, both the South East Region and Chattanooga/Hamilton County saw two more incident cases in 2004 compared to 2003, increasing their incidence of TB disease. West Tennessee Region saw an increase as well, with five additional incident cases compared to 2003 (12 cases, 2.3 cases per 100,000 population in 2003 and 17 cases, 3.3 cases per 100,000 population in 2004). Similarly, the Upper Cumberland Region saw six additional incident cases in 2004. Sullivan County reported having no cases of TB disease in 2003; however, in 2002 Sullivan County reported five incident cases of TB disease and six incident cases in 2004. Within the State of Tennessee, Memphis/Shelby County and Nashville/Davidson County, the two largest of the six metropolitan reporting areas, have continued to see a relatively high incidence of TB disease with case rates of 9.4 and 9.3 cases per 100,000 population respectively in 2004. However, where Nashville/Davidson County has seen a decline in the reporting of tuberculosis case rates of 10.9 in 2003 and 9.3 in 2004, Memphis/Shelby County is beginning to experience an increase in disease incidence (8.9 in 2003 and 9.4 in 2004). Please refer to Appendix 5 for region specific slides showing case rates over ten years for each regional health jurisdiction. (See Table 1, page 7.)

Table 1. Tuberculosis Cases and Morbidity Rates*: Tennessee & Reporting Areas, 2003-2004

| Reporting Area | 2003 | | | 2004 | | |
|-------------------------------|------------|------------|------------------------|------------|------------|------------------------|
| | Cases | Case Rates | Population Estimates** | Cases | Case Rates | Population Estimates** |
| Tennessee | 285 | 4.9 | 5,845,208 | 277 | 4.7 | 5,900,962 |
| Memphis/Shelby County † | 81 | 8.9 | 905,299 | 85 | 9.4 | 908,175 |
| West Tennessee Region | 12 | 2.3 | 516,900 | 17 | 3.3 | 519,194 |
| Jackson/Madison County † | 4 | 4.3 | 93,893 | 4 | 4.2 | 94,397 |
| Mid Cumberland Region | 35 | 3.9 | 904,576 | 19 | 2.0 | 927,771 |
| Nashville/Davidson County † | 62 | 10.9 | 570,136 | 53 | 9.3 | 572,475 |
| South Central Region | 16 | 4.5 | 357,885 | 16 | 4.4 | 361,898 |
| Upper Cumberland Region | 7 | 2.2 | 314,504 | 13 | 4.1 | 317,775 |
| Southeast Region | 12 | 3.9 | 304,967 | 14 | 4.6 | 307,508 |
| Chattanooga/Hamilton County † | 13 | 4.2 | 309,708 | 15 | 4.8 | 310,371 |
| East Tennessee Region | 24 | 3.5 | 687,424 | 20 | 2.9 | 696,257 |
| Knoxville/Knox County † | 7 | 1.8 | 396,672 | 6 | 1.5 | 400,061 |
| North East Tennessee Region | 12 | 3.6 | 330,316 | 9 | 2.7 | 332,582 |
| Sullivan County † | 0 | 0 | 152,928 | 6 | 3.9 | 152,498 |

† Indicates metropolitan reporting areas.

* Per 100,000 population

** Population estimates are of July of the respective year and from US Census Bureau.

Demographics

Demographics

Gender

Sixty-eight percent of the reported TB cases in Tennessee in 2004 were male, which is consistent with previous years. This same trend is seen throughout most of the reporting areas, with few exceptions. Both Upper Cumberland Region and Sullivan County both had more female cases than male cases. In Jackson/Madison County, East Tennessee Region, and Knoxville/Knox County, gender was more evenly distributed. (See Table 2, page 12.)

Age

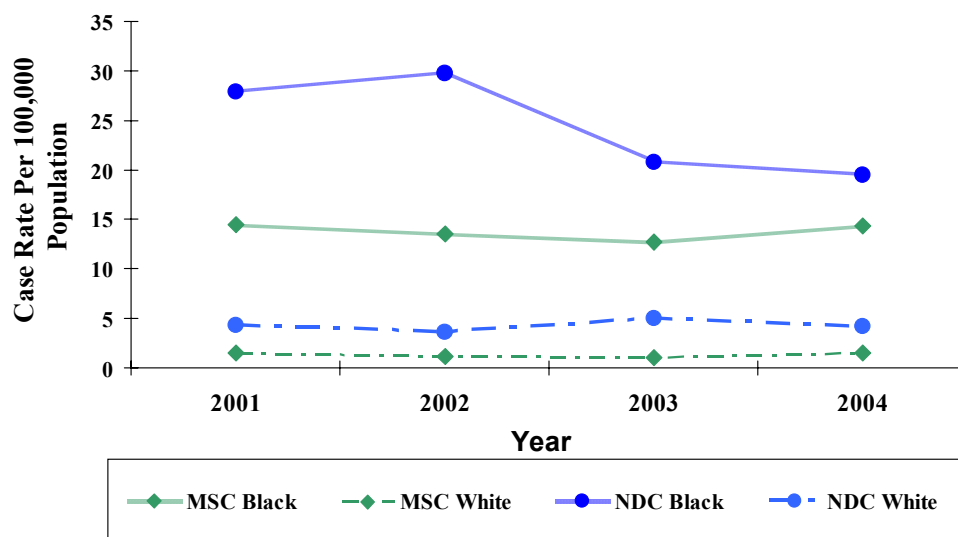
Sixty-six percent (183 cases) of Tennessee's TB cases reported in 2004 were aged greater than 45 years, with the greatest proportion of cases reported between the ages of 45 to 64 years (38%). This trend is seen throughout all of the reporting areas. From west to east across the State of Tennessee, the distribution of TB disease shifts from younger populations to older populations, with the exception of West Tennessee Region which reported 41% (seven cases) of their cases as being 65 years or older. Cases aged 25 to 44 years were less frequent than older cases, nevertheless individuals in this age group still made up 21% of the case burden in 2004. In addition, Tennessee reported six percent of the cases as aged 14 years or less, with four percent reported as four years or less. These cases were distributed between Memphis/Shelby County (four cases under five years), Nashville/Davidson County (four cases under five years and four cases between five and 14 years), and East Tennessee Region (one case under five years). (See Table 3, page 13.)

Race/Ethnicity

Using self reported information, Tennessee reported 44% of the cases in 2004 as Black Non-Hispanic, 39% as White Non-Hispanic, and 10% as Hispanic, of any race. Of those Black Non-Hispanic cases, 78% were either from Memphis/Shelby County (66 cases) or Nashville/Davidson County (30 cases). An effort to minimize the disparity between Whites and Blacks is necessary, especially in our largest metropolitan areas; Memphis/Shelby County and Nashville/Davidson County who have cases rates amongst the Black Non-Hispanic community of 14.4 cases per 100,000 population and 19.5 cases per 100,000 population, respectively. Figure 4 shows that the case rates of patients identified as Black Non-Hispanic are significantly larger in both metropolitan areas, as opposed to the case rates for patients identified as White Non-Hispanic (refer to Figure 4). Similarly, larger proportions of cases reported in Jackson/Madison County in 2004 were reported as Black Non-Hispanic and in West Tennessee Region, Chattanooga/Hamilton County, and Knoxville/Knox County cases were evenly distributed between White Non-Hispanic cases and Black Non-Hispanic cases. All other regions reported most of their cases as White Non-Hispanic. Ten percent of 2004 cases reported in Tennessee were Hispanic (of any race), with most of these cases reported in both Memphis/Shelby County and Mid Cumberland Region. The proportion of cases reported as being of Hispanic ethnicity has remained constant between 2000 and 2004. Regions in East and North East Tennessee, including Sullivan County, Knoxville/Knox County, and North East Tennessee, reported having no Hispanic cases in 2004. Since 2000, Tennessee has seen a slight relative increase in the proportion of cases identified as being Asian/Pacific Islander and relatively few cases having been identified as being American/Indian or Alaskan Native (less than one percent of cases reported in 2002).

Both Memphis Shelby County and Mid Cumberland Region each reported having six cases identified as Asian/Pacific Islander. No cases were reported in 2004 in Tennessee as American Indian or Alaskan Native. (See Table 4, page 14.)

Figure 4: Non-Hispanic White & Non-Hispanic Black Tuberculosis Case Rates, Memphis/Shelby County (MSC) & Nashville/Davidson County (NDC), 2001-2004



Population estimates are from the US Census Data and represent estimates at midpoint of each year. 2004 estimates are using 2003 population estimates and are preliminary.

Table 2. Tuberculosis Case and Percentages by Gender: Tennessee & Reporting Areas, 2004.

| Reporting Area | Total Cases | Male | | Female | |
|-------------------------------|-------------|------------|-------------|-----------|-------------|
| | | N | (%) | N | (%) |
| Tennessee | 277 | 187 | (68) | 90 | (32) |
| Memphis/Shelby County † | 85 | 58 | (68) | 27 | (32) |
| West Tennessee Region | 17 | 10 | (59) | 7 | (41) |
| Jackson/Madison County † | 4 | 2 | (50) | 2 | (50) |
| Mid Cumberland Region | 19 | 15 | (79) | 4 | (21) |
| Nashville/Davidson County † | 53 | 40 | (75) | 13 | (25) |
| South Central Region | 16 | 13 | (81) | 3 | (19) |
| Upper Cumberland Region | 13 | 6 | (46) | 7 | (54) |
| Southeast Region | 14 | 10 | (71) | 4 | (29) |
| Chattanooga/Hamilton County † | 15 | 10 | (67) | 5 | (33) |
| East Tennessee Region | 20 | 11 | (55) | 9 | (45) |
| Knoxville/Knox County † | 6 | 3 | (50) | 3 | (50) |
| North East Tennessee Region | 9 | 7 | (78) | 2 | (22) |
| Sullivan County † | 6 | 2 | (33) | 4 | (67) |

† Indicates metropolitan reporting areas.

Table 3. Tuberculosis Cases and Percentages by Age Group: Tennessee & Reporting Areas, 2004

| Reporting Area | All Ages | Age Groups | | | | | | | | | | | |
|-------------------------------|------------|------------|------------|----------|------------|-----------|------------|-----------|-------------|------------|-------------|-----------|-------------|
| | | Under 5 | | 5-14 | | 15-24 | | 25-44 | | 45-64 | | 65+ | |
| | | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) |
| Tennessee | 277 | 12 | (4) | 5 | (2) | 19 | (7) | 58 | (21) | 104 | (38) | 79 | (28) |
| Memphis/Shelby County † | 85 | 4 | (5) | -- | -- | 7 | (8) | 29 | (34) | 37 | (44) | 8 | (9) |
| West Tennessee Region | 17 | -- | -- | -- | -- | 3 | (18) | 1 | (6) | 6 | (35) | 7 | (41) |
| Jackson/Madison County † | 4 | -- | -- | -- | -- | -- | -- | 1 | (25) | 3 | (75) | -- | -- |
| Mid Cumberland Region | 19 | -- | -- | -- | -- | 1 | (5) | 2 | (11) | 12 | (63) | 4 | (21) |
| Nashville/Davidson County † | 53 | 4 | (8) | 4 | (8) | 4 | (8) | 11 | (20) | 25 | (47) | 5 | (9) |
| South Central Region | 16 | -- | -- | -- | -- | -- | -- | 4 | (25) | 1 | (6) | 11 | (69) |
| Upper Cumberland Region | 13 | 1 | (8) | -- | -- | 1 | (8) | 1 | (8) | 5 | (38) | 5 | (38) |
| Southeast Region | 14 | 2 | (14) | -- | -- | -- | -- | 1 | (7) | 4 | (29) | 7 | (50) |
| Chattanooga/Hamilton County † | 15 | -- | -- | -- | -- | 2 | (13) | 4 | (27) | 3 | (20) | 6 | (40) |
| East Tennessee Region | 20 | 1 | (5) | -- | -- | 1 | (5) | 4 | (20) | 3 | (15) | 11 | (55) |
| Knoxville/Knox County † | 6 | -- | -- | -- | -- | -- | -- | -- | -- | 3 | (50) | 3 | (50) |
| North East Tennessee Region | 9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 9 | (100) |
| Sullivan County † | 6 | -- | -- | 1 | (17) | 0 | -- | -- | -- | 2 | (33) | 3 | (50) |

† Indicates metropolitan reporting areas.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

Table 4. Tuberculosis Cases and Percentages by Hispanic Ethnicity and Non-Hispanic Race: Tennessee & Reporting Areas, 2004.

| Reporting Area | Race/Ethnicity | | | | | | | | | | | | |
|-------------------------------|----------------|--------------------|-------|--------------------|------|--------------------------------|-----|------------------------|------|----------|------|---------|-----|
| | All Ages | White Non-Hispanic | | Black Non-Hispanic | | American Indian/Alaskan Native | | Asian/Pacific Islander | | Hispanic | | Unknown | |
| | | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) |
| Tennessee | 277 | 109 | (39) | 122 | (44) | -- | -- | 16 | (6) | 28 | (10) | 2 | (1) |
| Memphis/Shelby County † | 85 | 6 | (7) | 66 | (78) | -- | -- | 6 | (7) | 5 | (6) | 2 | (2) |
| West Tennessee Region | 17 | 7 | (41) | 7 | (41) | -- | -- | -- | -- | 3 | (18) | -- | -- |
| Jackson/Madison County † | 4 | 1 | (25) | 2 | (50) | -- | -- | -- | -- | 1 | (25) | -- | -- |
| Mid Cumberland Region | 19 | 9 | (47) | 3 | (16) | -- | -- | 6 | (32) | 1 | (5) | -- | -- |
| Nashville/Davidson County † | 53 | 15 | (28) | 30 | (57) | -- | -- | 2 | (4) | 6 | (11) | -- | -- |
| South Central Region | 16 | 9 | (56) | 5 | (31) | -- | -- | -- | -- | 2 | (13) | -- | -- |
| Upper Cumberland Region | 13 | 10 | (77) | -- | -- | -- | -- | 1 | (8) | 2 | (15) | -- | -- |
| Southeast Region | 14 | 11 | (79) | -- | -- | -- | -- | -- | -- | 3 | (21) | -- | -- |
| Chattanooga/Hamilton County † | 15 | 6 | (40) | 6 | (40) | -- | -- | -- | -- | 3 | (20) | -- | -- |
| East Tennessee Region | 20 | 17 | (85) | -- | -- | -- | -- | 1 | (5) | 2 | (10) | -- | -- |
| Knoxville/Knox County † | 6 | 3 | (50) | 3 | (50) | -- | -- | -- | -- | -- | -- | -- | -- |
| North East Tennessee Region | 9 | 9 | (100) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sullivan County † | 6 | 6 | (100) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

† Indicates metropolitan reporting areas.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

Associated Risk Factors

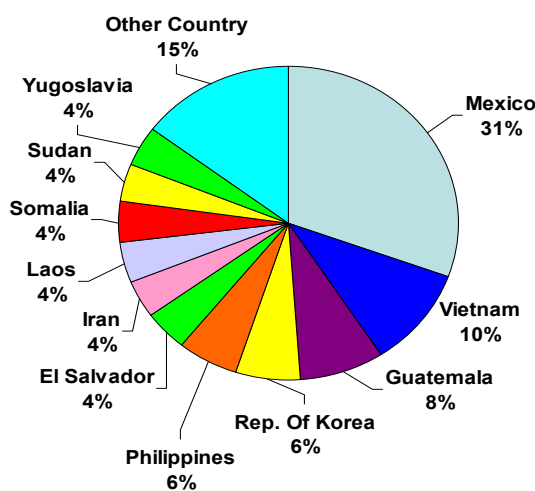
Risk Factors

Tennessee's TB Elimination Program considers being foreign born, HIV positive, homeless in the year prior to TB diagnosis, residing in a correctional facility or long term care facility at the time of TB diagnosis, using injection or non-injection drugs in the year prior to TB diagnosis, and excessive alcohol use in the year prior to TB diagnosis as major risk factors that could potentially increase a patient's risk of developing TB disease. Of the 277 TB cases reported in Tennessee in 2004, 148 (53%) reported having at least one identified risk factor. Six percent (17 cases) of all reported cases in 2004 reported having three or more risk factors. Forty-seven percent (eight cases) of these cases were reported in Memphis/Shelby County. Nashville/Davidson County reported seven cases (13%) with three or more risk factors, and both the South East Region and Chattanooga/Hamilton County each reported one case with three or more risk factors. (See Tables 5-8, pages 19-22.)

Foreign-Born

Over the past ten years, Tennessee has seen a dramatic increase in the number of foreign-born cases with almost one-fifth of the cases in 2004 (18%) reported as foreign-born where as in 1995 only six percent of the cases were identified as being foreign-born. Of those reported foreign-born cases in 2004, 31% reported being from Mexico. (Refer to Figure 5) A little over one-third (37%) of the cases reported in the Mid Cumberland Region were foreign-born. Nashville/Davidson County reported nearly 30% of their cases as foreign-born and both Jackson/Madison County and East Tennessee Region reported 25% of their cases as foreign-born. Memphis/Shelby County reported 10 cases (12%) who were identified as foreign-born. (See Table 6, page 20.)

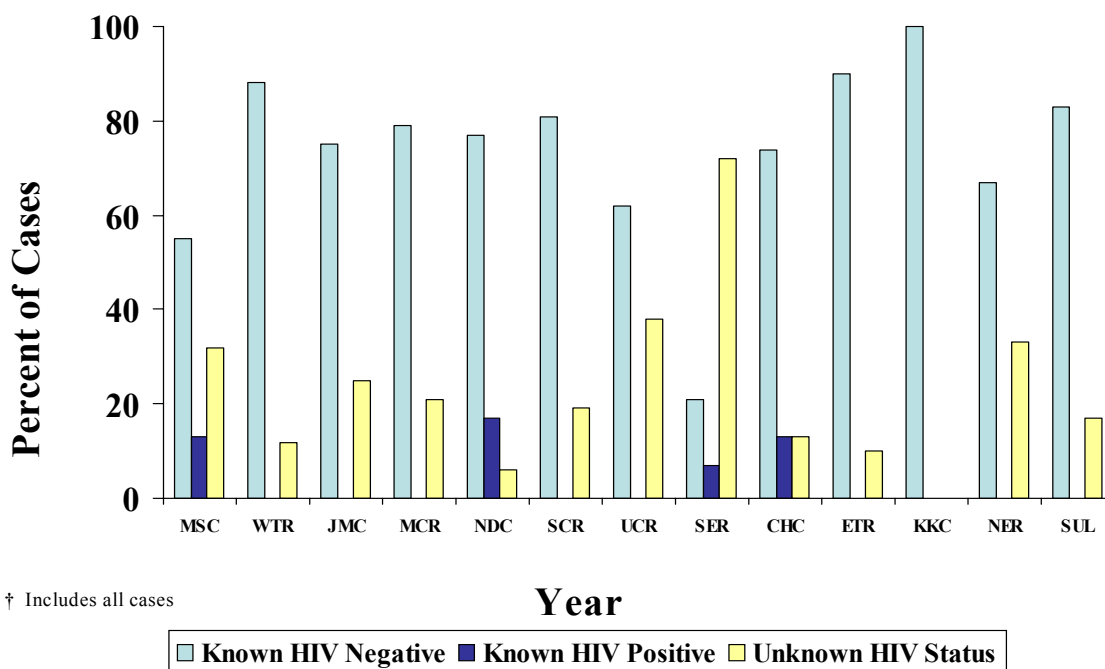
**Figure 5. Countries of Birth for Foreign-born
Tuberculosis Cases
Tennessee, 2004**



HIV

Seventy-seven percent of Tennessee's reported TB cases in 2004 had a known positive or negative HIV status and the remaining 23% had an unknown HIV status. Eight percent (23 cases) of all the reported TB cases in 2004 were HIV positive. HIV/TB co-morbid cases were reported from Nashville/Davidson County, Memphis/Shelby County, Chattanooga/Hamilton County, and Southeast Region. Nashville/Davidson had the largest proportion of cases identified as having HIV co-morbidity; however, Memphis/Shelby County reported the greatest frequency of HIV/TB co-morbid cases. Of those cases whose HIV status was unknown, 43% were reported from Memphis/Shelby County, which represents 32% of the cases reported in Memphis/Shelby County in 2004. The Southeast Region also reported a large proportion of cases in 2004 with an unknown HIV status (72%, or 10 cases). (See Table 7, page 21 & Figure 6.)

Figure 6. Tuberculosis Cases By HIV Status† Tennessee Regions, 2004



Homelessness

Homelessness for TB reporting purposes refers to those patients who were homeless during the year prior to TB diagnosis, not necessarily referring to those residing in a homeless shelter or homeless at the time of TB diagnosis or during TB treatment. Ten percent (27 cases) of the cases reported in 2004 in Tennessee reported being homeless during the year prior to TB diagnosis. Of those, 74% were reported in Nashville/Davidson County and Memphis/Shelby County (10 cases each). The remaining homeless cases were reported in the Mid Cumberland Region (two cases), the South East Region (one case), Chattanooga/Hamilton County (three cases), and the East Tennessee Region (one case). Of Nashville/Davidson County's total cases, nearly one-fifth of their cases, or 19%, were identified as being homeless during the year prior to TB diagnosis. Similarly, Chattanooga/Hamilton County also reported 20% of their total cases as homeless. (See Table 8, page 22.)

Correctional Facilities

Patients identified as residing in a correctional facility refer to those cases who resided in either a jail or a prison at the time of TB diagnosis. In 2004, four percent (11 cases) of Tennessee's TB cases resided in a correctional facility at the time of TB diagnosis. Both Nashville/Davidson County and Memphis/Shelby County each contributed approximately 90% of those cases (10 total cases, five cases each). Of these health jurisdictions' total cases reported in 2004, cases who resided in a correctional facility at the time of TB diagnosis for Nashville/Davidson County and Memphis/Shelby County represented nine percent and six percent, respectively. The remaining 10% (one case) was reported in the Mid Cumberland Region, which represented five percent of Mid Cumberland Region's total reported cases in 2004. (See Table 8, page 22.)

Long Term Care Facility

Patients identified as residing in a long term care facility refer to those cases who resided in such a facility at the time of TB diagnosis. In 2004, five percent (13 cases) of the cases reported in Tennessee resided in a long term care facility at the time of TB diagnosis. No reporting area reported having more than two cases residing in a long term care facility. Jackson/Madison County, the Upper Cumberland Region, and East Tennessee Region all reported having no cases residing a long term care facility at the time of TB diagnosis. The West Tennessee Region, Nashville/Davidson County, and Chattanooga/Hamilton County each reported two cases residing in a long term care facility at the time of TB diagnosis. (See Table 8, page 22.)

Drug and Alcohol Use

Injection and non-injection drug use, as well as excessive alcohol use refer to drug use occurring during the year prior to TB diagnosis. Please refer to Appendix 1 for RVCT Form Completion Instructions. In 2004, Tennessee reported injection drug use in three percent (seven cases) of its TB cases, and non-injection drug use in 10% (28 cases) of its cases. Injection drug use of cases during the year prior to TB diagnosis was only reported in Memphis/Shelby County (five cases) and Nashville/Davidson County (two cases). Only Memphis/Shelby County, Nashville/Davidson County, and the Mid Cumberland Region reported cases with non-injection drug use during the year prior to TB diagnosis. Almost 20% of cases in Both Nashville/Davidson County and Memphis/Shelby County reported non-injection drug use during the year prior to TB diagnosis. Patients identified with excessive alcohol use in Tennessee in 2004 comprised 22% (61 cases) of the total cases. Of those, 54% (33 cases) were reported in Memphis/Shelby County, which represents 39% of Memphis/Shelby County's total cases. Nashville/Davidson County contributed 15 cases, or 25% of all cases reported in Tennessee in 2004 who were identified as having used excessive alcohol in the year prior to TB diagnosis. These cases represented 28% of Nashville/Davidson County's total cases. The remaining cases reported with excessive alcohol use were distributed among several other reporting areas. Four reporting areas reported no cases having used excessive alcohol within the year prior to TB diagnosis. (See Table 8, page 22.)

Table 5. Tuberculosis Cases and Percentages by Number of Risk Factors Reported*: Tennessee & Reporting Areas, 2004

| Reporting Area | Total Cases | No Risk Factors | | 1 or 2 Risk Factors | | 3 or More Risk Factors | |
|-------------------------------|-------------|-----------------|-------------|---------------------|-------------|------------------------|------------|
| | | N | (%) | N | (%) | N | (%) |
| Tennessee | 277 | 129 | (47) | 131 | (47) | 17 | (6) |
| Memphis/Shelby County † | 85 | 31 | (37) | 46 | (54) | 8 | (9) |
| West Tennessee Region | 17 | 12 | (71) | 5 | (29) | -- | -- |
| Jackson/Madison County † | 4 | 2 | (50) | 2 | (50) | -- | -- |
| Mid Cumberland Region | 19 | 8 | (42) | 11 | (58) | -- | -- |
| Nashville/Davidson County † | 53 | 11 | (21) | 35 | (66) | 7 | (13) |
| South Central Region | 16 | 10 | (63) | 6 | (37) | -- | -- |
| Upper Cumberland Region | 13 | 8 | (62) | 5 | (38) | -- | -- |
| Southeast Region | 14 | 10 | (72) | 3 | (21) | 1 | (7) |
| Chattanooga/Hamilton County † | 15 | 7 | (47) | 7 | (47) | 1 | (6) |
| East Tennessee Region | 20 | 12 | (60) | 8 | (40) | -- | -- |
| Knoxville/Knox County † | 6 | 5 | (83) | 1 | (17) | -- | -- |
| North East Tennessee Region | 9 | 8 | (89) | 1 | (11) | -- | -- |
| Sullivan County † | 6 | 5 | (83) | 1 | (17) | -- | -- |

† Indicates metropolitan reporting areas.

* Risk factors include foreign-born, HIV co-morbidity, homelessness in year prior to diagnosis, residing in a correctional or long term care facility at time of TB diagnosis, using injection or non injection drugs in year prior to TB diagnosis, and excessive alcohol use in year prior to TB diagnosis.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

Table 6. Tuberculosis Cases and Percentages by Foreign Born Status: Tennessee & Reporting Areas, 2004

| Reporting Area | Total Cases | US-Born Cases | | Foreign-Born Cases | | Unknown Origin | |
|-------------------------------|-------------|---------------|-------------|--------------------|-------------|----------------|-----|
| | | N | (%) | N | (%) | N | (%) |
| Tennessee | 277 | 228 | (82) | 49 | (18) | -- | -- |
| Memphis/Shelby County † | 85 | 75 | (88) | 10 | (12) | -- | -- |
| West Tennessee Region | 17 | 15 | (88) | 2 | (12) | -- | -- |
| Jackson/Madison County † | 4 | 3 | (75) | 1 | (25) | -- | -- |
| Mid Cumberland Region | 19 | 12 | (63) | 7 | (37) | -- | -- |
| Nashville/Davidson County † | 53 | 38 | (72) | 15 | (28) | -- | -- |
| South Central Region | 16 | 14 | (88) | 2 | (12) | -- | -- |
| Upper Cumberland Region | 13 | 10 | (77) | 3 | (23) | -- | -- |
| Southeast Region | 14 | 13 | (93) | 1 | (7) | -- | -- |
| Chattanooga/Hamilton County † | 15 | 12 | (80) | 3 | (20) | -- | -- |
| East Tennessee Region | 20 | 15 | (75) | 5 | (25) | -- | -- |
| Knoxville/Knox County † | 6 | 6 | (100) | -- | -- | -- | -- |
| North East Tennessee Region | 9 | 9 | (100) | -- | -- | -- | -- |
| Sullivan County † | 6 | 6 | (100) | -- | -- | -- | -- |

† Indicates metropolitan reporting areas.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

Table 7. Tuberculosis Cases and Percentages by HIV Status: Tennessee & Reporting Areas, 2004

| Reporting Area | Total Cases | Known Negative HIV Status | | Known Positive HIV Status | | Unknown HIV Status* | |
|-------------------------------|-------------|---------------------------|-------------|---------------------------|------------|---------------------|-------------|
| | | N | (%) | N | (%) | N | (%) |
| Tennessee | 277 | 191 | (69) | 23 | (8) | 63 | (23) |
| Memphis/Shelby County † | 85 | 47 | (55) | 11 | (13) | 27 | (32) |
| West Tennessee Region | 17 | 15 | (88) | -- | -- | 2 | (12) |
| Jackson/Madison County † | 4 | 3 | (75) | -- | -- | 1 | (25) |
| Mid Cumberland Region | 19 | 15 | (79) | -- | -- | 4 | (21) |
| Nashville/Davidson County † | 53 | 41 | (77) | 9 | (17) | 3 | (6) |
| South Central Region | 16 | 13 | (81) | -- | -- | 3 | (19) |
| Upper Cumberland Region | 13 | 8 | (62) | -- | -- | 5 | (38) |
| Southeast Region | 14 | 3 | (21) | 1 | (7) | 10 | (72) |
| Chattanooga/Hamilton County † | 15 | 11 | (74) | 2 | (13) | 2 | (13) |
| East Tennessee Region | 20 | 18 | (90) | -- | -- | 2 | (10) |
| Knoxville/Knox County † | 6 | 6 | (100) | -- | -- | -- | -- |
| North East Tennessee Region | 9 | 6 | (67) | -- | -- | 3 | (33) |
| Sullivan County † | 6 | 5 | (83) | -- | -- | 1 | (17) |

† Indicates metropolitan reporting areas.

* Unknown HIV status includes indeterminate results, patients who refused testing, patients who were not offered testing, unknown results of tests completed, and unknown and missing.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

Table 8. Tuberculosis Cases and Percentages* by Risk Factor: Tennessee & Reporting Areas, 2004

| Reporting Area | Risk Factor | | | | | | | | | | | | |
|--------------------------------------|-------------|---------------------------|------|------------------------------------|-----|--------------------------------------|------|---------------------------------|-----|-------------------------------------|------|------------------------------------|------|
| | All Cases | Homelessness ¹ | | Correctional Facility ² | | Long Term Care Facility ³ | | Injection Drug Use ¹ | | Non-Injection Drug Use ¹ | | Excessive Alcohol Use ¹ | |
| | | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) |
| Tennessee | 277 | 27 | (10) | 11 | (4) | 13 | (5) | 7 | (3) | 28 | (10) | 61 | (22) |
| Memphis/ Shelby County † | 85 | 10 | (12) | 5 | (6) | 1 | (1) | 5 | (6) | 17 | (20) | 33 | (39) |
| West Tennessee Region | 17 | -- | -- | -- | -- | 2 | (12) | -- | -- | -- | -- | 1 | (6) |
| Jackson/ Madison County † | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | (25) |
| Mid Cumberland Region | 19 | 2 | (11) | 1 | (5) | 1 | (5) | -- | -- | 1 | (5) | -- | -- |
| Nashville/ Davidson County† | 53 | 10 | (19) | 5 | (9) | 2 | (4) | 2 | (4) | 10 | (19) | 15 | (28) |
| South Central Region | 16 | -- | -- | -- | -- | 1 | (6) | -- | -- | -- | -- | 3 | (19) |
| Upper Cumberland Region | 13 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2 | (15) |
| Southeast Region | 14 | 1 | (7) | -- | -- | 1 | (7) | -- | -- | -- | -- | 2 | (14) |
| Chattanooga/ Hamilton County † | 15 | 3 | (20) | -- | -- | 2 | (13) | -- | -- | -- | -- | 2 | (13) |
| East Tennessee Region | 20 | 1 | (5) | -- | -- | -- | -- | -- | -- | -- | -- | 2 | (10) |
| Knoxville/ Knox County † | 6 | -- | -- | -- | -- | 1 | (17) | -- | -- | -- | -- | -- | -- |
| North East Tennessee Region | 9 | -- | -- | -- | -- | 1 | (11) | -- | -- | -- | -- | -- | -- |
| Sullivan County † | 6 | -- | -- | -- | -- | 1 | (17) | -- | -- | -- | -- | -- | -- |

† Indicates metropolitan reporting areas.

* Relative Frequencies (%) are mutually exclusive and therefore may not add up to 100%.

¹ Refers to patients identified having these risk factors during year prior to TB diagnosis.

² Refers to those patients who resided in a correctional facility at the time of TB diagnosis.

³ Refers to those patients who resided in a long term care facility at the time of TB diagnosis.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

Clinical Management

Clinical Management

Site of Disease

Seventy-seven percent (214 cases) of the TB cases reported in Tennessee in 2004 were identified as having only pulmonary TB disease. Patients identified as having only extra-pulmonary disease comprised 16% (44 cases) of the total cases reported in 2004. The remaining seven percent of the reported cases had both pulmonary and extra-pulmonary TB disease. This trend is consistent with that of Tennessee's reporting areas in 2004, with the exception of Knoxville/Knox County, which reported 50% of their cases with only pulmonary disease and 50% of their cases with both pulmonary and extra-pulmonary disease. (See Table 9, page 28.)

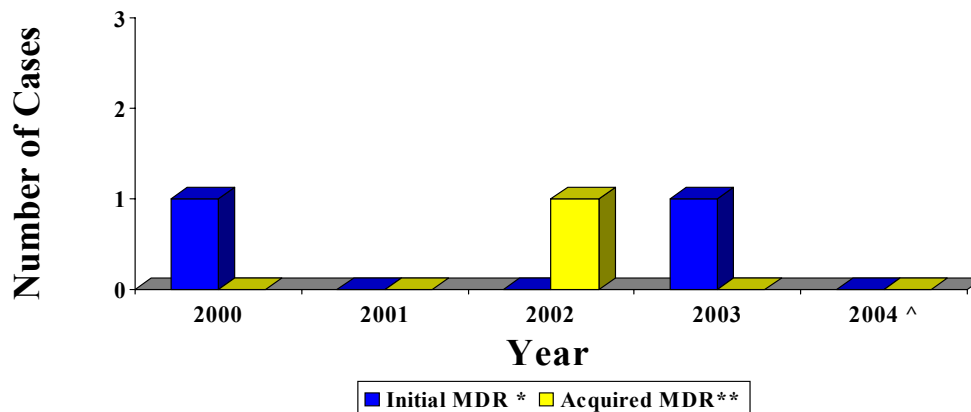
Tuberculosis Case Classification

TB cases are classified as either culture positive cases (from any sample), sputum smear positive cases, clinical cases, or provider verified cases. (See Appendix 1 for Case Definitions and link to Case Verification/Classification Criteria in the Calculated Variables portion of the TIMS Documentation.) In 2004, Tennessee reported 77% of its cases as culture positive. Chattanooga/Hamilton County, Knoxville/Knox County, and the North East Region all reported 100% of their cases as culture positive cases. Most regions reported the majority of their cases as culture positive, except for Jackson/Madison County, which reported only 25% (one case) of their cases as culture positive and the remaining 75% of their cases as clinical cases. In 2004, Tennessee classified only one case, less than one percent as sputum smear positive, which was reported in the Mid Cumberland Region. Sixteen percent (45 cases) of Tennessee's cases reported in 2004 were reported as clinical cases. Thirty-eight percent of the clinical cases were reported in Memphis/Shelby County. This represented 20% of Memphis/Shelby County's total cases for 2004. Six percent of total cases reported in 2004 were provider verified. Thirty-one percent of the provider verified cases were reported in Nashville/Davidson County, and 25% were reported in the Mid Cumberland Region. (See Table 10, page 29.)

Multi-Drug Resistance

TB drug resistance can only be determined from the growth of viable *Mycobacterium tuberculosis* cultures, and therefore is only described of culture positive tuberculosis cases. Multi-drug resistance (MDR) refers to *Mycobacterium tuberculosis* that is resistant to both Isoniazid (INH) and Rifampin (RIF). MDR can be described as either initial MDR, referring to patients whose infections were initially resistant to both INH and RIF, or acquired MDR, referring to patients whose *Mycobacterium tuberculosis* developed resistance to both INH and RIF during treatment. Tennessee reported having no cases in 2004 having initial MDR or acquired MDR. However, it should be noted that data for final drug susceptibilities (acquired MDR) for 2004 cases is preliminary as cases may currently be completing treatment and therefore may not have final drug susceptibility testing completed. Though reports of MDR are uncommon in Tennessee, two cases in the past five years were reported as having initial MDR tuberculosis: one case in 2000 and one case in 2003. (Refer to Figure 7.) Tennessee also reported having one case of acquired MDR tuberculosis in 2002. (Refer to Figure 7.) As patients complete treatment, acquired MDR statistics will change; specifically of those cases whose treatment lasts more than 12 months or who are non-compliant with TB therapy. (See Table 11, page 30.)

**Figure 7. Multi-Drug Resistance (MDR)
of TB Cases
Tennessee, 2000-2004**



^ 2004 Acquired MDR data is preliminary

* Initial MDR refers to those patients who were culture positive and that had initial drug susceptibility testing and who were found to have TB resistant to both INH and RIF .

** Acquired MDR refers to those patients who were alive at diagnosis developed MDR TB, who were not initially found to have MDR TB.

Use of Directly Observed Therapy

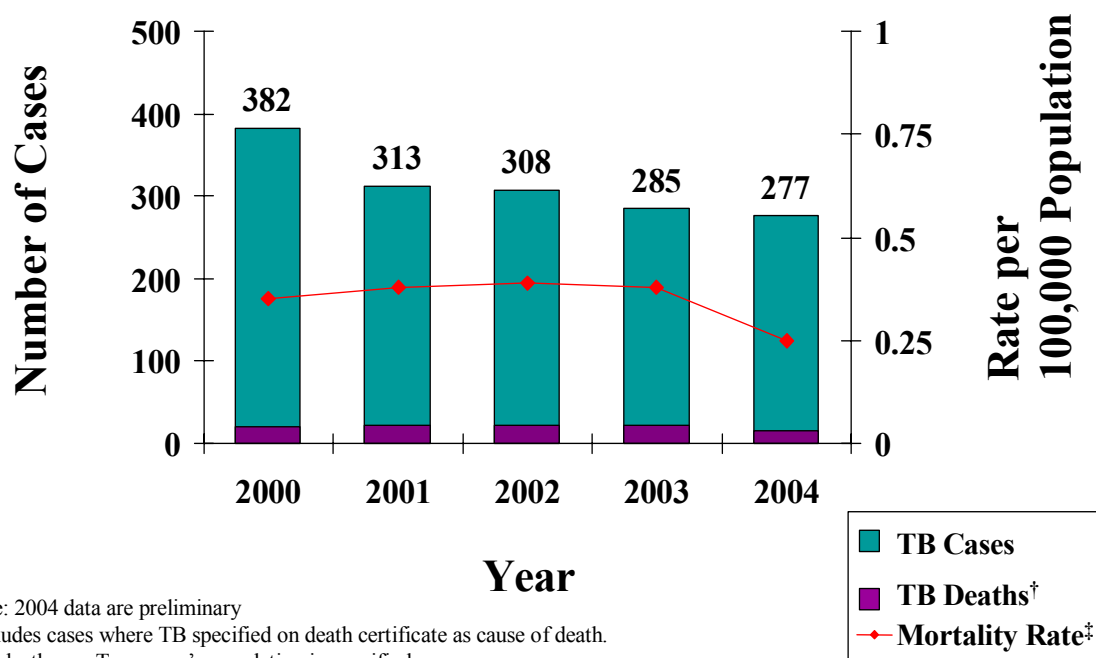
The 2004 case management and treatment completion data are preliminary due to the length of TB treatment and therefore such data are reported for 2003. The State of Tennessee endorses the use of directly observed therapy (DOT) for the treatment of all tuberculosis cases to promote treatment completion and treatment compliance and has seen a steady increase in the use of DOT since 2001. Tennessee reported 95% (271 cases) of its 2003 cases alive at diagnosis. Of those, 53% (144 cases) were treated with strict Directly Observed Therapy (DOT). (Please refer to Appendix 1 for RVCT Form Completion Instructions) Forty-three percent (115 cases) of the reported cases alive at diagnosis in 2003 were treated with a combination of both SAT and DOT and one percent (three cases) of the cases alive at diagnosis reported were treated with complete Self Administered Therapy (SAT). Cases treated with SAT were reported in Jackson/Madison County (25% of their total cases), Nashville/Davidson County (two percent of their total cases), and Chattanooga/Hamilton County (eight percent of their total cases). Of those cases treated with both DOT and SAT, 60% (69 cases) were reported in Memphis/Shelby County, which represented 90% of Memphis/Shelby County's total cases that were reported as alive at diagnosis. Nashville/Davidson County reported 41% of its cases alive at diagnosis as treated with both DOT and SAT, contributing 21% of the total cases treated using such methods. North East Region contributed nine cases alive at diagnosis who were treated with both SAT and DOT (eight percent of the total cases treated with DOT and SAT), which represented 82% of its cases alive at diagnosis. The West Tennessee, South Central, and Upper Cumberland Regions reported 100% of their cases treated by strict DOT in 2003. With the exception of three reporting areas, the majority of cases reported in 2003 who were alive at diagnosis were treated with strict DOT. These exceptions include Memphis/Shelby County, Jackson/Madison County, and the North East Region which each reported two cases treated with strict DOT, comprising three percent, 50%, and 18% of their cases alive at diagnosis, respectively. It is believed that a misunderstanding of how the use of strict DOT is reported is reflected in this report; we may experience a more drastic

change in the proportion of cases treated with strict DOT in future reports. (See Table 12, page 31.)

Mortality

The frequency of death due to tuberculosis has remained constant since 2000; although in 2004 deaths due to TB were less frequent, as illustrated in Figure 8, the data are preliminary. In 2004, three percent (seven cases) of the reported tuberculosis cases were dead at the time of TB diagnosis and 11% of the tuberculosis cases died during therapy. (Death is of all causes, not just TB.) The proportion of cases who were dead at the time of TB diagnosis in 2004 is consistent with previous years; however, the proportion of cases who died during TB therapy has increased. This is especially important to note since the 2004 deaths occurring during treatment are preliminary as many patients are currently completing treatment. Several reporting areas experienced very little or no mortality between 2002 and 2004, with Jackson/Madison County reporting no mortality during this time period and Sullivan County only reporting one 2002 case who died during therapy. Over the past three years, both Nashville/Davidson County and Memphis/Shelby County, Tennessee's largest metropolitan areas, both experienced greater mortality of tuberculosis cases than most regions. Nashville/Davidson County reported five of their 2004 cases who have already died during therapy. The reporting area also experienced a decrease in the frequency of cases who were found dead at diagnosis in 2004. Though the frequency of cases found dead at diagnosis during this time period has remained the same (four cases, five percent) for Memphis/Shelby County, the county has already experienced an increase in the frequency of cases dying during therapy in 2004, similar to that seen for Tennessee as a whole. (See Table 13, page 32.)

**Figure 8. Tuberculosis Mortality Rates
Tennessee, 2000-2004**



Treatment Completion

Treatment completion is critical not only to ensure patient care, but to help prevent any further transmission to others. Treatment completion rates are calculated in Tennessee by duration of treatment, either within 12 months where indicated, or at any time and are described for 2003 cases for reasons mentioned previously. (Please see Appendix 4 for Calculation Methods.) In 2003, 82% of patients who were alive at the time of TB diagnosis and who were started on treatment completed treatment within twelve months if indicated to do so by their physician. Overall, 93% (223 cases) of all patients eligible to complete treatment completed anytime. The remaining seven percent (17 cases) had not completed treatment by July 14th 2005, when the data was extracted from TIMS for this report. The South Central, Upper Cumberland, and Southeast Regions, as well as Knoxville/Knox County all reported 100% of their 2003 cases completing treatment within 12 months. Jackson/Madison County, Chattanooga/Hamilton County, and the North East Region all reported having 100% of their cases complete treatment anytime, with large majorities having completed within 12 months. The remaining regions all reported having cases who did not complete treatment. Of the seven percent, or 17 cases not completing treatment, 59% were reported in Memphis/Shelby County, comprising 13% of Memphis/Shelby County's 2003 cases eligible to complete treatment. Nashville/Davidson County contributed three cases or 17% of the 2003 cases who did not complete treatment, which comprised six percent of its cases eligible to complete treatment. West Tennessee Region contributed two cases or 12% of the 2003 cases who did not complete treatment, which comprised 18% of its cases eligible to complete treatment. Both Mid Cumberland and East Tennessee Regions reported one case each that did not complete treatment, contributing to an additional 12% of the cases not completing treatment, at which comprised 3% and six percent of the each regions' cases eligible to complete treatment, respectively. (See Table 14, page 33.)

Table 9. Tuberculosis Cases and Percentages by Site of Disease: Tennessee & Reporting Areas, 2004

| Reporting Area | All Cases | Only Pulmonary Disease | | Only Extra-Pulmonary Disease | | Both Pulmonary & Extra-Pulmonary Disease | |
|-------------------------------|------------|------------------------|-------------|------------------------------|-------------|--|------------|
| | | N | (%) | N | (%) | N | (%) |
| Tennessee | 277 | 214 | (77) | 44 | (16) | 19 | (7) |
| Memphis/Shelby County † | 85 | 62 | (73) | 15 | (16) | 8 | (9) |
| West Tennessee Region | 17 | 12 | (71) | 4 | (23) | 1 | (6) |
| Jackson/Madison County † | 4 | 3 | (75) | 1 | (25) | -- | -- |
| Mid Cumberland Region | 19 | 15 | (78) | 2 | (11) | 2 | (11) |
| Nashville/Davidson County † | 53 | 45 | (85) | 8 | (15) | -- | -- |
| South Central Region | 16 | 13 | (81) | 3 | (19) | -- | -- |
| Upper Cumberland Region | 13 | 10 | (77) | 2 | (15) | 1 | (8) |
| Southeast Region | 14 | 9 | (64) | 2 | (14) | 3 | (22) |
| Chattanooga/Hamilton County † | 15 | 12 | (80) | 1 | (7) | 2 | (13) |
| East Tennessee Region | 20 | 16 | (80) | 2 | (10) | 2 | (10) |
| Knoxville/Knox County † | 6 | 3 | (50) | 3 | (50) | -- | -- |
| North East Tennessee Region | 9 | 9 | (100) | -- | -- | -- | -- |
| Sullivan County † | 6 | 5 | (83) | 1 | (17) | -- | -- |

† Indicates metropolitan reporting areas.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

Table 10. Tuberculosis Cases and Percentages by Tuberculosis Case Classification: Tennessee & Reporting Areas, 2004

| Reporting Area | All Cases | Culture Positive* | | Sputum Smear Positive | | Clinical Case | | Provider Verified | |
|-------------------------------|------------|-------------------|-------------|-----------------------|------------|---------------|-------------|-------------------|------------|
| | | N | (%) | N | (%) | N | (%) | N | (%) |
| Tennessee | 277 | 215 | (77) | 1 | (1) | 45 | (16) | 16 | (6) |
| Memphis/Shelby County † | 85 | 67 | (79) | -- | -- | 17 | (20) | 1 | (1) |
| West Tennessee Region | 17 | 11 | (65) | -- | -- | 6 | (35) | -- | -- |
| Jackson/Madison County † | 4 | 1 | (25) | -- | -- | 3 | (75) | -- | -- |
| Mid Cumberland Region | 19 | 12 | (63) | 1 | (5) | 2 | (11) | 4 | (21) |
| Nashville/Davidson County † | 53 | 39 | (74) | -- | -- | 9 | (17) | 5 | (9) |
| South Central Region | 16 | 14 | (88) | -- | -- | -- | -- | 2 | (13) |
| Upper Cumberland Region | 13 | 11 | (84) | -- | -- | 1 | (8) | 1 | (8) |
| Southeast Region | 14 | 12 | (86) | -- | -- | 1 | (7) | 1 | (7) |
| Chattanooga/Hamilton County † | 15 | 15 | (100) | -- | -- | -- | -- | -- | -- |
| East Tennessee Region | 20 | 14 | (70) | -- | -- | 5 | (25) | 1 | (5) |
| Knoxville/Knox County † | 6 | 6 | (100) | -- | -- | -- | -- | -- | -- |
| North East Tennessee Region | 9 | 9 | (100) | -- | -- | -- | -- | -- | -- |
| Sullivan County † | 6 | 4 | (67) | -- | -- | 1 | (17) | 1 | (17) |

† Indicates metropolitan reporting areas.

* All cases whose positive culture was obtained from a sputum sample or from another sample.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

Table 11. Tuberculosis Cases and Percentages by Culture Positive and MDR* Status: Tennessee & Reporting Areas, 2004

| Reporting Area | Total Cases | Culture Positive Cases ¹ | | Initial MDR Cases ² | | Acquired MDR Cases ^{3**} | |
|-------------------------------|-------------|-------------------------------------|-------------|--------------------------------|-----|-----------------------------------|-----|
| | | N | (%) | N | (%) | N | (%) |
| Tennessee | 277 | 215 | (78) | -- | -- | -- | -- |
| Memphis/Shelby County † | 85 | 67 | (79) | -- | -- | -- | -- |
| West Tennessee Region | 17 | 11 | (65) | -- | -- | -- | -- |
| Jackson/Madison County † | 4 | 1 | (25) | -- | -- | -- | -- |
| Mid Cumberland Region | 19 | 12 | (63) | -- | -- | -- | -- |
| Nashville/Davidson County † | 53 | 39 | (74) | -- | -- | -- | -- |
| South Central Region | 16 | 14 | (88) | -- | -- | -- | -- |
| Upper Cumberland Region | 13 | 11 | (85) | -- | -- | -- | -- |
| Southeast Region | 14 | 12 | (86) | -- | -- | -- | -- |
| Chattanooga/Hamilton County † | 15 | 15 | (100) | -- | -- | -- | -- |
| East Tennessee Region | 20 | 14 | (70) | -- | -- | -- | -- |
| Knoxville/Knox County † | 6 | 6 | (100) | -- | -- | -- | -- |
| North East Tennessee Region | 9 | 9 | (100) | -- | -- | -- | -- |
| Sullivan County † | 6 | 4 | (67) | -- | -- | -- | -- |

† Indicates metropolitan reporting areas.

* MDR refers to Multi drug resistance; defined as tuberculosis resistant to both INH and RIF.

** 2004 Acquired MDR TB case data are preliminary.

¹ Refers to all cases whose positive culture was obtained from a sputum sample or from some other sample.

² Refers to those patients who were culture positive and that initial drug susceptibility testing and who were found to have tuberculosis resistant to both INH and RIF.

³ Refers to those patients who were alive at diagnosis and culture positive, who had initial drug susceptibility testing and were found not to have tuberculosis initially resistant to both INH and RIF, but had final drug susceptibility testing demonstrating tuberculosis resistance to both INH and RIF.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

Table 12. Tuberculosis Cases and Percentages by Use of Directly Observed Therapy: Tennessee & Reporting Areas, 2003*

| Reporting Area | All Cases | Cases Alive at Diagnosis | | SAT Only ¹ | | DOT Only ² | | Both DOT & SAT | | Unknown | |
|-------------------------------|------------|--------------------------|-------------|-----------------------|------------|-----------------------|-------------|----------------|-------------|----------|------------|
| | | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) |
| Tennessee | 285 | 271 | (95) | 3 | (1) | 144 | (53) | 115 | (43) | 9 | (3) |
| Memphis/Shelby County † | 81 | 77 | (95) | -- | -- | 2 | (3) | 69 | (90) | 6 | (7) |
| West Tennessee Region | 12 | 12 | (100) | -- | -- | 12 | (100) | -- | -- | -- | -- |
| Jackson/Madison County † | 4 | 4 | (100) | 1 | (25) | 2 | (50) | 1 | (25) | -- | -- |
| Mid Cumberland Region | 35 | 33 | (94) | -- | -- | 29 | (88) | 4 | (12) | -- | -- |
| Nashville/Davidson County † | 62 | 59 | (95) | 1 | (2) | 32 | (54) | 24 | (41) | 2 | (3) |
| South Central Region | 16 | 16 | (100) | -- | -- | 16 | (100) | -- | -- | -- | -- |
| Upper Cumberland Region | 7 | 7 | (100) | -- | -- | 7 | (100) | -- | -- | -- | -- |
| Southeast Region | 12 | 11 | (92) | -- | -- | 7 | (64) | 3 | (27) | 1 | (9) |
| Chattanooga/Hamilton County † | 13 | 13 | (100) | 1 | (8) | 10 | (77) | 2 | (15) | -- | -- |
| East Tennessee Region | 24 | 21 | (88) | -- | -- | 20 | (95) | 1 | (5) | -- | -- |
| Knoxville/Knox County † | 7 | 7 | (100) | -- | -- | 5 | (71) | 2 | (29) | -- | -- |
| North East Tennessee Region | 12 | 11 | (92) | -- | -- | 2 | (18) | 9 | (82) | -- | -- |
| Sullivan County †** | 0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

† Indicates metropolitan reporting areas.

* 2004 treatment completion data cannot be calculated until 2006 and therefore 2003 data are reported.

** Sullivan County did not report any cases of Tuberculosis in 2003.

¹ Refers to Self Administered Therapy.

² Refers to Directly Observed Therapy.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

N/A indicates that the frequency (N) and relative frequency (%) are not applicable or incalculable.

Table 13. Tuberculosis Cases and Percentages by Mortality* Status: Tennessee & Reporting Areas, 2002-2004

| Reporting Area | 2002 | | | | | 2003 | | | | | 2004 | | | | |
|--------------------------------------|------------|-------------------|------------|---------------------|------------|------------|-------------------|------------|---------------------|-------------|------------|-------------------|------------|-----------------------|-------------|
| | All Cases | Dead At Diagnosis | | Died During Therapy | | All Cases | Dead At Diagnosis | | Died During Therapy | | All Cases | Dead At Diagnosis | | Died During Therapy** | |
| | | N | (%) | N | (%) | | N | (%) | N | (%) | | N | (%) | N | (%) |
| Tennessee | 308 | 12 | (4) | 19 | (6) | 285 | 13 | (5) | 29 | (10) | 277 | 7 | (3) | 30 | (11) |
| Memphis/ Shelby County † | 80 | 4 | (5) | 3 | (4) | 81 | 4 | (5) | 2 | (3) | 85 | 4 | (5) | 7 | (8) |
| West Tennessee Region | 19 | -- | -- | 2 | (11) | 12 | -- | -- | 1 | (8) | 17 | -- | -- | 4 | (24) |
| Jackson/ Madison County † | 3 | -- | -- | -- | -- | 4 | -- | -- | -- | -- | 4 | -- | -- | -- | -- |
| Mid Cumberland Region | 28 | 1 | (4) | 1 | (4) | 35 | 1 | (3) | 2 | (6) | 19 | -- | -- | 1 | (5) |
| Nashville/ Davidson County † | 66 | 3 | (5) | 2 | (3) | 62 | 3 | (5) | 5 | (8) | 53 | -- | -- | 5 | (9) |
| South Central Region | 21 | 1 | (5) | 2 | (10) | 16 | -- | -- | 4 | (25) | 16 | -- | -- | 6 | (38) |
| Upper Cumberland Region | 17 | -- | -- | 2 | (12) | 7 | -- | -- | 2 | (29) | 13 | 1 | (8) | 1 | (8) |
| Southeast Region | 20 | 1 | (5) | 1 | (5) | 12 | 1 | (8) | 2 | (17) | 14 | -- | -- | -- | -- |
| Chattanooga/ Hamilton County † | 17 | 1 | (6) | 1 | (6) | 13 | -- | -- | 2 | (15) | 15 | -- | -- | 2 | (13) |
| East Tennessee Region | 19 | 1 | (5) | 3 | (16) | 24 | 3 | (13) | 4 | (17) | 20 | 1 | (5) | 1 | (5) |
| Knoxville/Knox County † | 6 | -- | -- | -- | -- | 7 | -- | -- | 1 | (14) | 6 | 1 | (17) | -- | -- |
| North East Tennessee Region | 7 | -- | -- | 1 | (14) | 12 | 1 | (8) | 4 | (33) | 9 | -- | -- | 3 | (33) |
| Sullivan County †*** | 5 | -- | -- | 1 | (20) | 0 | NA | NA | NA | NA | 6 | -- | -- | -- | -- |

† Indicates metropolitan reporting areas.

* Death is of all causes, not just tuberculosis.

** 2004 data is preliminary due to the length of tuberculosis treatment.

*** Sullivan County had no reported cases of tuberculosis in 2003.

-- Indicates that the frequency (N) and relative frequency (%) of the event equals zero.

N/A indicates that the frequency (N) and relative frequency (%) are not applicable or incalculable.

Table 14. Tuberculosis Cases and Percentages by Treatment Completion: Tennessee & Reporting Areas, 2003¹

| Reporting Area | Total Cases | Completed Treatment in 12 Months or Less ² as Indicated | | Completed Treatment Anytime [*] | |
|---|-------------|--|-------------|--|-------------|
| | | N | (%) | N | (%) |
| Tennessee ^{**} | 285 | 197 | (82) | 223 | (93) |
| Memphis/Shelby County † ^{**} | 81 | 53 | (72) | 64 | (87) |
| West Tennessee Region | 12 | 7 | (64) | 9 | (82) |
| Jackson/Madison County † | 4 | 2 | (50) | 4 | (100) |
| Mid Cumberland Region | 35 | 28 | (88) | 31 | (97) |
| Nashville/Davidson County † ^{**} | 62 | 43 | (81) | 50 | (94) |
| South Central Region | 16 | 12 | (100) | 12 | (100) |
| Upper Cumberland Region | 7 | 5 | (100) | 5 | (100) |
| Southeast Region ^{**} | 12 | 8 | (100) | 8 | (100) |
| Chattanooga/Hamilton County † | 13 | 10 | (91) | 11 | (100) |
| East Tennessee Region | 24 | 15 | (88) | 16 | (94) |
| Knoxville/Knox County † | 7 | 6 | (100) | 6 | (100) |
| North East Tennessee Region | 12 | 6 | (86) | 7 | (100) |
| Sullivan County † ³ | 0 | NA | NA | NA | NA |

† Indicates metropolitan reporting areas.

¹ Due to the length of tuberculosis treatment, 2004 treatment completion data cannot be calculated until 2006 and therefore 2003 treatment completion data is reported.

² Calculation excludes cases who were dead at diagnosis and who died during therapy, cases with rifampin (RIF) resistance, and cases who were less than 15 years of age with meningeal, bone, joint or military tuberculosis disease (as per CDC calculations of the treatment completion).

³ Sullivan County reported having no tuberculosis cases in 2003.

N/A indicates that the frequency (N) and relative frequency (%) are not applicable or incalculable

* Refers to those patients included in reference 1.

** The Southeast Region reported 1 case with rifampin resistance in 2003, who has not completed treatment. Both Nashville/Davidson County and Memphis/Shelby County each reported 1 case that was less than 15 years of age with meningeal, bone, joint or military tuberculosis disease in 2003, who have completed treatment. This increases the state's total proportion of cases that completed treatment anytime to 93.8% for 2003. This change does not significantly change the proportion of cases who completed treatment anytime in 2003 for Memphis/Shelby County or Nashville/Davidson County. However, this change does decrease the proportion of cases who completed treatment anytime in the Southeast Region in 2003 to 89%.

Appendices

Appendix 1: Case Definition* & RVCT Form Completion Instructions & Calculated Variables Websites

A clinically verified case of TB is a case that meets *all* of the following criteria:

- A positive tuberculin skin test;
- and
- Other signs and symptoms compatible with TB, such as an abnormal, unstable (worsening or improving) chest x-ray, or clinical evidence of current disease;
- and
- Treatment with two or more anti-tuberculosis medications;
- and
- Complete diagnostic evaluation.

The laboratory criteria for the diagnosis of TB are as follows:

- Isolation of *M. tuberculosis* (culture) from a clinical specimen;
- or
- Demonstration of *M. tuberculosis* from a clinical specimen by nucleic acid amplification test;
- or
- Demonstration of acid-fast bacilli (smear) in clinical specimen when culture has not been or cannot be obtained.

* Case definition was taken from the Report of Verified Cases of Tuberculosis (RVCT) instructions produced by the CDC located in Appendix SUR I of the TIMS User's Guide.

RVCT Form Completion Instructions (SUR I) and Calculated Variables (SUR IV):

<http://ftp.cdc.gov/pub/Software/TIMS/Documentation/>

Appendix 2: Reporting Guidelines



STATE OF TENNESSEE
DEPARTMENT OF HEALTH
CORDELL HULL BUILDING
Fourth Floor, CEDS
425 5th AVENUE NORTH
NASHVILLE, TENNESSEE 37247

October 1, 2004

Dear Colleagues:

I would like to make you aware of new requirements for reporting **tuberculosis (TB)** to the Tennessee Department of Health:

Effective July 1, 2004, all persons with known or suspected TB, including pulmonary and extrapulmonary disease, must be reported to the Tennessee Department of Health within 12 hours by phone (T.C.A. 68-10-101; Chapter 120014-1.02 of the Rules and Regulations of Communicable Diseases). This verbal report should include the name, age, sex, race, and address of the patient. Written notification providing the same information must also be submitted within one week, preferably using forms provided by the Department. Persons to report include patients who you treat or consider treating for active TB.

Early notification of TB suspects and cases enables the Department of Health to ensure appropriate treatment of TB suspects and cases and to provide all patients with essential services including counseling and education regarding TB disease and treatment, "client centered" case management, free treatment under directly observed therapy, and monitoring for toxicity and compliance throughout therapy. Early notification also enables the Department of Health to initiate a contact investigation promptly to identify additional persons with active TB or latent TB infection, thus preventing further spread of disease. Providers should report TB cases and suspects directly to the Regional Health Office TB Clinic designated for the county where the patient resides. Please note that Health Department TB Clinic providers can provide consultation if you are considering the possibility of TB and whether or not to initiate isolation and treatment. For your convenience, a map showing the regional divisions that should be used for reporting purposes is attached, as well as contact names, phone and fax numbers for each Regional Office. Updated forms for written notification are available on-line at:

<http://www2.state.tn.us/health/Downloads/ph-1600.pdf>.

Please remember to "THINK TB" when evaluating persons with compatible clinical findings, especially those with known TB risk factors such as foreign-birth, HIV, substance abuse, homelessness, immunosuppressive treatment or conditions (i.e. chemotherapy, steroids, or TNF- α blocking agents such as infliximab (Remicade), and residence or employment in correctional facilities or long-term care facilities). A list of TB risk factors and other TB related resources can be obtained at the following websites:

<http://www2.state.tn.us/health/CEDS/TB/guidelines.htm>.

<http://www.cdc.gov/nchstp/tb/default.htm>.

If you have any questions regarding this notice, please contact your Regional Health Office or the Tennessee Department of Health at (615) 741-7247.

Thank you for working with us to protect the public health.

Sincerely,

Connie A. Haley, M.D., MPH
TB Control Officer and Medical Director
TB Elimination Program Tennessee
Department of Health 4th Floor, Cordell
Hull Building 425 5th Ave. N.
Nashville, TN 37247



TUBERCULOSIS ELIMINATION PROGRAM
STATE OF TENNESSEE
DEPARTMENT OF HEALTH
CORDELL HULL BUILDING, FOURTH FLOOR
425 5th AVENUE NORTH
NASHVILLE, TENNESSEE 37247

January 2004 (Revised September 2004 I-15)

To Whom It May Concern:

Re: Public Health Reporting and HIPAA

The Tuberculosis (TB) Elimination Program, as part of the Communicable and Environmental Disease Services Section of the Tennessee Department of Health, conducts surveillance for tuberculosis in its capacity as a public health authority as defined by the Health Insurance Portability and Accountability Act (HIPAA), Standards for Privacy of Individually Identifiable Health Information: Final Rule (Privacy Rule) [45 CFR §164.501].

Pursuant to 45 CFR § 164.512(b) of the Privacy Rule, covered entities such as your organization may disclose, without individual authorization, protected health information to public health authorities "...authorized by law to collect or receive such information for the purpose of preventing or controlling disease, injury, or disability, including, but not limited to, the reporting of disease, injury, vital events such as birth or death, and the conduct of public surveillance, public health investigations, and public health interventions...".

The authority to conduct surveillance, which may include examination of medical records, comes from the Communicable Diseases Rules of the Tennessee Code Annotated, Chapter 1200-14-1. "Medical records shall be made available when requested, for inspection and copying of, by a duly authorized representative of the Department while in the course of investigating a reportable disease under these regulations." (1200-14-1-.15)

The Privacy Rule provides that covered entities "... may rely, if such reliance is reasonable under the circumstances, on a requested disclosure as the minimum necessary for the stated purposes when making disclosures to public officials that are permitted under 45 CFR §164.512, if the public official represents that the information requested is the minimum necessary for the stated purpose(s)." The information being requested represents the minimum necessary to carry out the public health purposes of the TB Elimination Program pursuant to 45 CFR §164.514(d) of the Privacy Rule.

The requirement to provide the Tennessee Department of Health with information regarding notifiable diseases, and the authority to do so without patient authorization, does not release covered entities from the requirement to account for those disclosures. The Centers for Disease Control (CDC) published in the April 11, 2003 MMWR provisions covering “Accounting for Public Health Disclosures”, which states “where the covered entity has, during the accounting period, made multiple disclosures to the same recipient for the same purpose, the Privacy Rule provides for a simplified means of accounting. In such cases, the covered entity need only identify the recipient of such repetitive disclosures, the purpose of the disclosure, and describe the PHI routinely disclosed. The date of each disclosure need not be tracked. Rather, the accounting may include the date of the first and last such disclosure during the accounting period, and a description of the frequency or periodicity of such disclosures.” A copy of this CDC MMWR publication is enclosed for your information and reference.

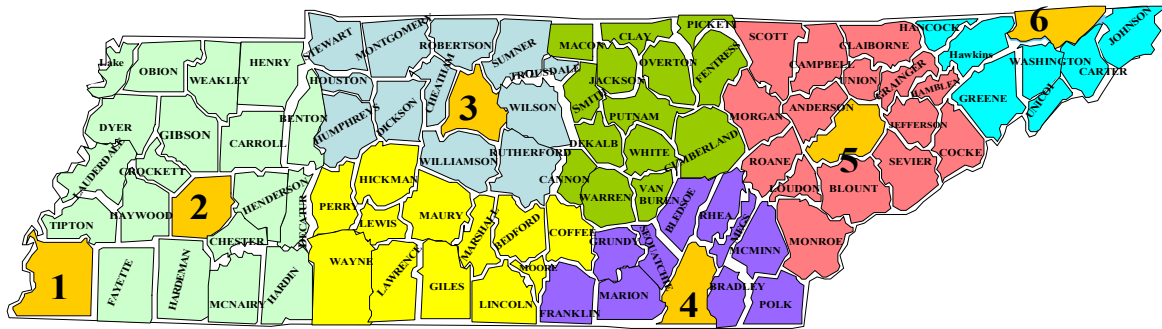
Thank you and your institution for continuing to work so diligently with the Tennessee Department of Health TB Elimination Program to ensure the safety and health of all Tennesseans. If you have any questions, please feel free to call the TB Elimination Program at 615-741-7247.

Sincerely,

Connie Haley, M.D., M.P.H.
Tuberculosis Control Officer and Medical Director
Tennessee Department of Health
425 5th Avenue North, 4th floor
Cordell Hull Building
Nashville, TN 37247

Appendix 3: County Map of Tennessee

County Map of Tennessee



Metropolitan Areas and Regions

• Metro Reporting Areas

1. Memphis/Shelby County
2. Jackson/Madison County
3. Nashville/Davidson County
4. Chattanooga/Hamilton County
5. Knoxville/Knox County
6. Sullivan County

● West Tennessee Region

● Mid Cumberland Region

● South Central Region

● Upper Cumberland Region

● Southeast Tennessee Region

● East Tennessee Region

● North East Tennessee Region

Appendix 4: Calculation Methods used for Treatment Completion Rates

Calculation Worksheet:

Treatment Completion for Those Whom Therapy for 1 Year or Less was Indicated

Denominator:

Take the total # of cases counted for the specified time period
(Typically a cohort year)

Subtract the # of cases that were dead @ diagnosis

Subtract the # of cases that died during tx

Subtotal

From the Subtotal,

Subtract the # of cases with rifampin resistance

Subtract the # of cases that are less than 15 years old
With meningeal, bone, joint or miliary TB

Denominator

* Note that denominator includes those who were lost, refused tx, moved, etc.

Numerator:

TX Completion Anytime, Numerator 1:

From the denominator,

Subtract the # of cases that were either
lost to follow-up, moved, refused tx, or stopped
tx for some other reason

Numerator 1:

TX Completion within 12 Months, Numerator 2:

From the denominator,

Subtract the # of cases that were either
lost to follow-up moved, refused tx, or stopped
tx for some other reason

Subtract the # of cases that completed tx in > 52.143 weeks

* In excel spread sheet, after you remove the previously mentioned cases, add a column called 'time in weeks', which should be formatted in general format. In the first cell, in type in the following formula that should reflect the following: =sum (stopther-rxdate)/7. For the stop therapy date and the rx date, you will need to click on the corresponding cells to add them in the formula.

Numerator 2:

Divide each numerator by the denominator and multiply by 100 for %.

Tx Completion Anytime= $\frac{\text{NUM 1}}{\text{DEN}} \times 100$
=

Tx Completion w/n 12 Months= $\frac{\text{NUM 2}}{\text{DEN}} \times 100$
=

Appendix 5: Tennessee's TB Elimination Program Fact Sheet



Communicable and Environmental Disease Services Tuberculosis Elimination Program 2004 Tuberculosis Fact Sheet

- Globally, at least one person is infected with TB each second, and someone dies of TB every ten seconds. One-third of the world's population is infected with TB. TB accounts for more than one-quarter of all preventable adult deaths in developing countries.

US Data:

- In 2003, 14,874 TB cases were reported in the United States; this was a decline of 1.3% from the 15,075 cases reported in 2002. Since 1999, there has been a decline of 15.2% in the number of TB cases in the United States. This represents the ninth consecutive year that TB cases declined in the U.S., suggesting that the nation is recovering from the resurgence of TB that occurred in the mid-1980s, and is back on track toward TB elimination.

Tennessee Data:

- In 2003, 285 cases of TB were reported for the State of Tennessee, ranking Tennessee 12th among all U.S. states for total TB cases in 2003. In 2004, Tennessee was ranked 13th in the nation for total TB cases, with 277 cases of TB reported, indicating a decline of 2.8% in total TB cases. The TB case rate for 2004 was 4.7 cases per 100,000, which is the lowest ever recorded case rate for Tennessee.
- More males were reported with tuberculosis in Tennessee than females; in 2004, 187 cases (68%) were male, and 90 (32%) were female.
- In 2004, the age group with the largest percentage of reported TB cases in Tennessee was the 45-64 year old age group (38%), followed by the 65 and older age group (28%), the 25-44 year age group (21%), and lastly, the 0-24 age group (13%).
 - There were 12 TB cases age 0-4 (4%) and 5 cases age 5-14 (2%)

- The racial/ethnic breakdown of Tennessee TB cases reported in 2004 was as follows: Non-Hispanic Whites, 39% (109); Non-Hispanic Blacks, 44% (122); Hispanics, 10% (28); Asian/Pacific Islanders, 6% (16).
- TB cases born outside of the U.S. comprised 18% of the reported TB cases in 2004. This is an 11% increase from 7 % in 1997. Of the 49 foreign-born cases reported in 2004, 31% were from Mexico, 10% from Vietnam, 8% were from Guatemala, and The Republic of Korea and Philippines each represented 6%. El Salvador, Iran, Laos, Somalia, Sudan, and Yugoslavia each represented 4% of total foreign-born cases. Other countries represented 15% of the total foreign-born cases in 2004.
- In 2004, 10% of reported TB cases in Tennessee were identified as being homeless.
- In 2004, 4% of reported Tennessee TB cases were residents of a correctional facility at time of diagnosis.
- Twenty-two percent of TN's TB cases reported in 2004 gave a history of excessive alcohol use.
- The percentage of TB cases co-infected with HIV was 8% in 2004. Of these, 39% were between the ages of 25 and 44.

Appendix 6: 2004 Tuberculosis Cases and Case Rates by County and Region for the State of Tennessee

| 2004 Regional Tuberculosis Case and Rate Table with Population Estimates ** | | | | |
|---|------------|-------|-------|--|
| NORTHEAST TN REGION (NER) | | | | |
| County Name | Population | Cases | Rate* | |
| CARTER | 58394 | 0 | 0.0 | |
| GREENE | 63991 | 5 | 7.8 | |
| HANCOCK | 6702 | 1 | 14.9 | |
| HAWKINS | 55037 | 2 | 3.6 | |
| JOHNSON | 17948 | 0 | 0.0 | |
| SULLIVAN | 153050 | 6 | 3.9 | |
| UNICOI | 17709 | 0 | 0.0 | |
| WASHINGTON | 110078 | 1 | 0.9 | |
| Total | 482909 | 15 | 3.1 | |
| UPPER CUMBERLAND REGION (UCR) | | | | |
| County Name | Population | Cases | Rate* | |
| CANNON | 13204 | 0 | 0.0 | |
| CLAY | 7947 | 0 | 0.0 | |
| CUMBERLAND | 49391 | 1 | 2.0 | |
| DeKALB | 18037 | 0 | 0.0 | |
| FENTRESS | 16935 | 1 | 5.9 | |
| JACKSON | 11208 | 2 | 17.8 | |
| MACON | 21023 | 0 | 0.0 | |
| OVERTON | 20151 | 2 | 9.9 | |
| PICKETT | 5006 | 1 | 20.0 | |
| PUTNAM | 64973 | 4 | 6.2 | |
| SMITH | 18225 | 0 | 0.0 | |
| VAN BUREN | 5478 | 1 | 18.3 | |
| WARREN | 39129 | 1 | 2.6 | |
| WHITE | 23584 | 0 | 0.0 | |
| Total | 314291 | 13 | 4.1 | |
| TENNESSEE STATEWIDE: | | | | |
| | Population | Cases | Rate* | |
| Total | 5859856 | 277 | 4.7 | |
| EAST TN REGION (ETR) | | | | |
| County Name | Population | Cases | Rate* | |
| ANDERSON | 71904 | 0 | 0.0 | |
| BLOUNT | 111510 | 7 | 6.3 | |
| CAMPBELL | 40125 | 0 | 0.0 | |
| CLAIBORNE | 30415 | 1 | 3.3 | |
| COCKE | 34329 | 1 | 2.9 | |
| GRAINGER | 21445 | 1 | 4.7 | |
| HAMBLEEN | 58851 | 0 | 0.0 | |
| JEFFERSON | 46919 | 2 | 4.3 | |
| LOUDON | 41624 | 3 | 7.2 | |
| MONROE | 41051 | 0 | 0.0 | |
| MORGAN | 20080 | 0 | 0.0 | |
| ROANE | 52424 | 1 | 1.9 | |
| SCOTT | 21675 | 0 | 0.0 | |
| SEVIER | 75503 | 4 | 5.3 | |
| UNION | 18830 | 0 | 0.0 | |
| Total | 686685 | 20 | 2.9 | |
| SOUTHEAST TN REGION (SER) | | | | |
| County Name | Population | Cases | Rate* | |
| BLED SOE | 12556 | 0 | 0.0 | |
| BRADLEY | 90264 | 3 | 3.3 | |
| FRANKLIN | 40512 | 1 | 2.5 | |
| GRUNDY | 14389 | 0 | 0.0 | |
| MARION | 27880 | 0 | 0.0 | |
| McMINN | 50632 | 1 | 2.0 | |
| MEIGS | 11430 | 2 | 17.5 | |
| POLK | 16171 | 5 | 30.9 | |
| RHEA | 29286 | 2 | 6.8 | |
| SEQUATCHIE | 11958 | 0 | 0.0 | |
| Total | 305078 | 14 | 4.6 | |
| TN METROPOLITAN AREAS | | | | |
| MEM-SHELBY COUNTY (MSR) | | | | |
| | Population | Cases | Rate* | |
| Total | 905678 | 85 | 9.4 | |
| NASH-DAVIDSON COUNTY (NDR) | | | | |
| | Population | Cases | Rate* | |
| Total | 570785 | 53 | 9.3 | |
| KNOXVILLE-KNOX COUNTY (KKR) | | | | |
| | Population | Cases | Rate* | |
| Total | 389327 | 6 | 1.5 | |
| CHATT-HAMILTON COUNTY (CHR) | | | | |
| | Population | Cases | Rate* | |
| Total | 309321 | 15 | 4.8 | |

* Rates are per 100,000 population

** Population county estimates provided July 2003

* Rates are per 100,000 population

** Population county estimates provided July 2003

| 2004 Regional Tuberculosis Case and Rate Table with Population Estimates ** | | | | |
|---|------------|-------|-------|--|
| MID-CUMBERLAND REGION (MCR) | | | | |
| County Name | Population | Cases | Rate* | |
| CHEATHAM | 37364 | 4 | 10.7 | |
| DICKSON | 44935 | 1 | 2.2 | |
| HOUSTON | 8085 | 1 | 12.4 | |
| HUMPHREYS | 18123 | 0 | 0.0 | |
| MONTGOMERY | 141064 | 4 | 2.8 | |
| ROBERTSON | 58181 | 1 | 1.7 | |
| RUTHERFORD | 202310 | 4 | 2.0 | |
| STEWART | 12847 | 0 | 0.0 | |
| SUMNER | 138752 | 1 | 0.7 | |
| TROUSDALE | 7447 | 0 | 0.0 | |
| WILLIAMSON | 141301 | 0 | 0.0 | |
| WILSON | 95366 | 3 | 3.1 | |
| Total | 905775 | 19 | 2.1 | |
| * Rates are per 100,000 population | | | | |
| ** Population county estimates provided July 2003 | | | | |
| SOUTH CENTRAL REGION (SCR) | | | | |
| County Name | Population | Cases | Rate* | |
| BEDFORD | 40253 | 3 | 7.5 | |
| COFFEE | 49643 | 2 | 4.0 | |
| GILES | 29390 | 2 | 6.8 | |
| HICKMAN | 23352 | 0 | 0.0 | |
| LAWRENCE | 40704 | 3 | 7.4 | |
| LEWIS | 11438 | 0 | 0.0 | |
| LINCOLN | 31773 | 1 | 3.1 | |
| MARSHALL | 27537 | 0 | 0.0 | |
| MAURY | 73198 | 4 | 5.5 | |
| MOORE | 5911 | 0 | 0.0 | |
| PERRY | 7627 | 1 | 13.1 | |
| WAYNE | 16947 | 0 | 0.0 | |
| Total | 357773 | 16 | 4.5 | |
| WEST TN REGION (WTR) | | | | |
| County Name | Population | Cases | Rate* | |
| BENTON | 16500 | 0 | 0.0 | |
| CARROLL | 29342 | 0 | 0.0 | |
| CHESTER | 37364 | 1 | 2.7 | |
| CROCKETT | 14491 | 3 | 20.7 | |
| DECATUR | 11610 | 0 | 0.0 | |
| DYER | 37308 | 0 | 0.0 | |
| FAYETTE | 32289 | 1 | 3.1 | |
| GIBSON | 47922 | 1 | 2.1 | |
| HARDEMAN | 28174 | 1 | 3.5 | |
| HARDIN | 25927 | 0 | 0.0 | |
| HAYWOOD | 19626 | 0 | 0.0 | |
| HENDERSON | 25900 | 2 | 7.7 | |
| HENRY | 31185 | 0 | 0.0 | |
| LAKE | 7824 | 1 | 12.8 | |
| LAUDERDALE | 27077 | 3 | 11.1 | |
| MADISON | 93873 | 4 | 4.3 | |
| McNAIRY | 24938 | 1 | 4.0 | |
| OBION | 32386 | 1 | 3.1 | |
| TIPTON | 54184 | 0 | 0.0 | |
| WEAKLEY | 34314 | 2 | 5.8 | |
| Total | 632234 | 21 | 3.3 | |

* Rates are per 100,000 population

** Population county estimates provided July 2003

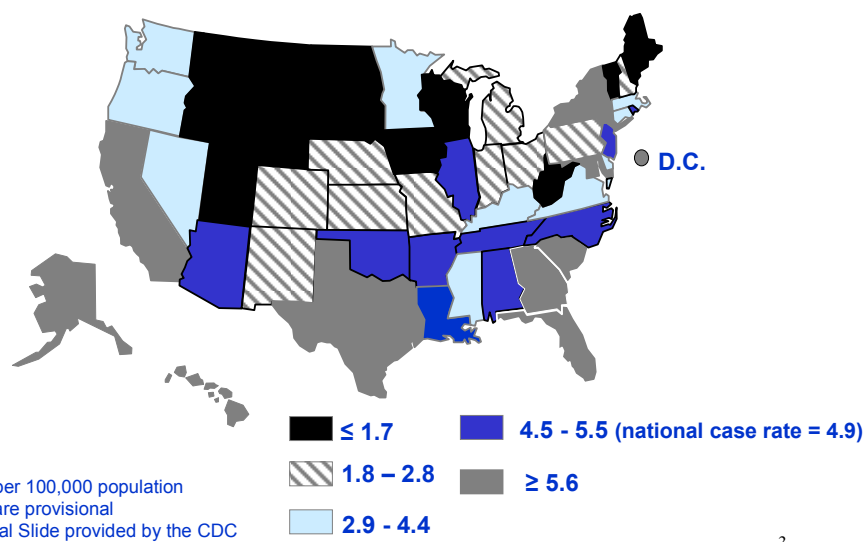
Appendix 7: Slide Set 2004 Epidemiologic Profile of Tuberculosis in Tennessee

Slide Set

2004 Epidemiological Profile of Tuberculosis in Tennessee

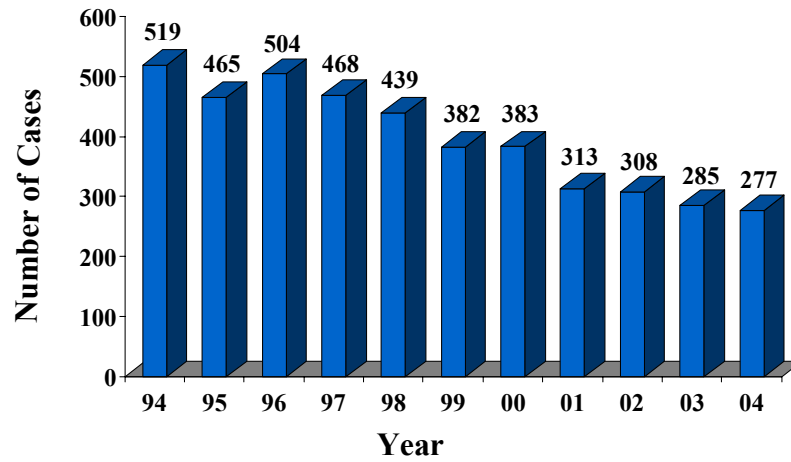
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Rate* of Tuberculosis Cases, by State: United States, 2004[†]



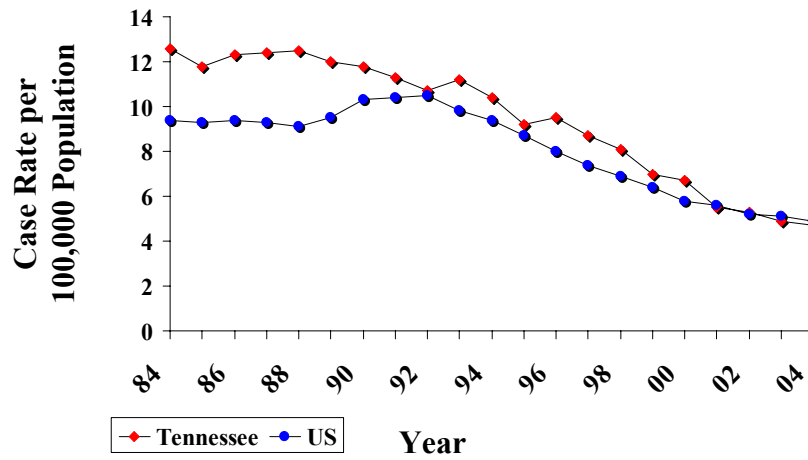
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Reported Tuberculosis Cases Tennessee, 1994-2004



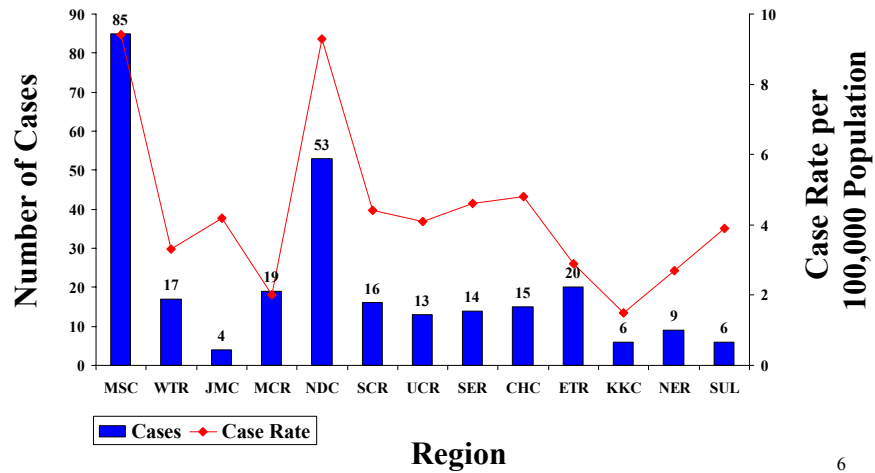
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Tuberculosis Case Rates Tennessee and United States, 1984-2004



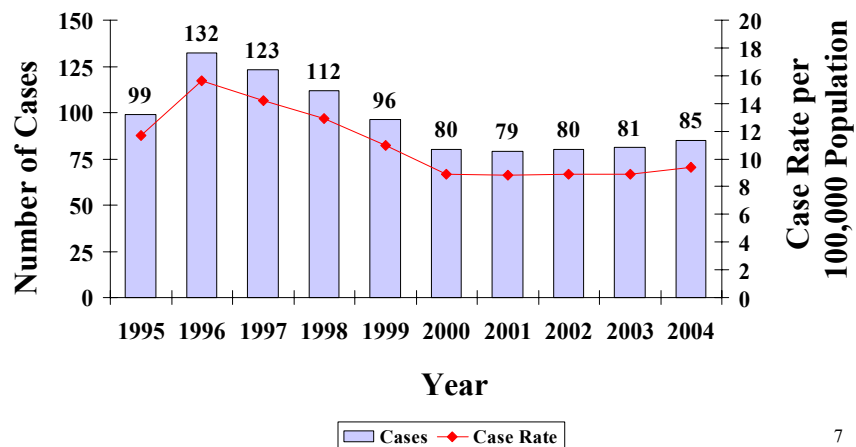
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Tuberculosis Cases and Case Rates by Region Tennessee Regions, 2004



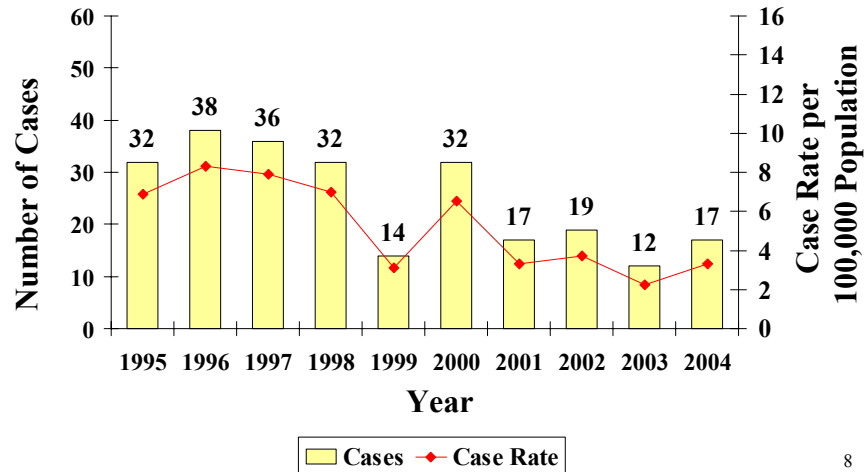
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Tuberculosis Cases and Case Rates Memphis/Shelby County, 1995-2004



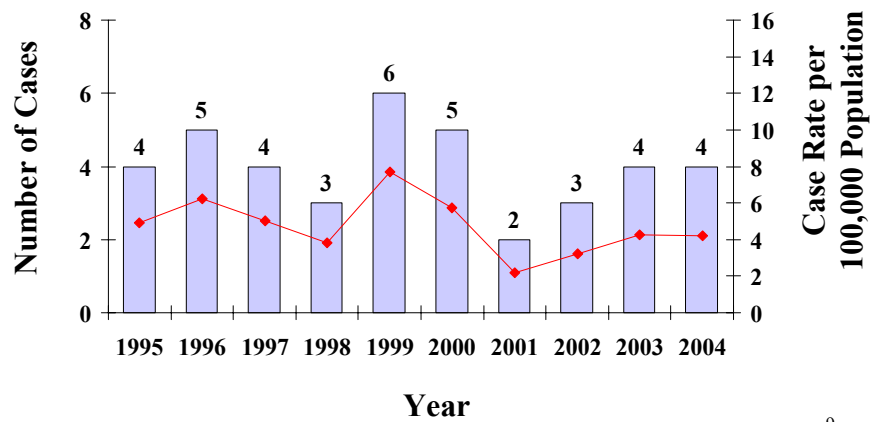
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Tuberculosis Cases and Case Rates West Tennessee Region, 1995-2004



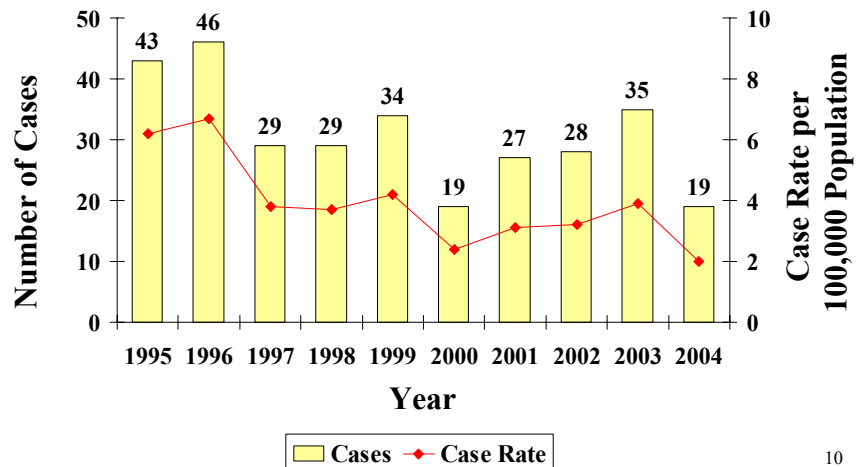
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Tuberculosis Cases and Case Rates Jackson/Madison County, 1995-2004



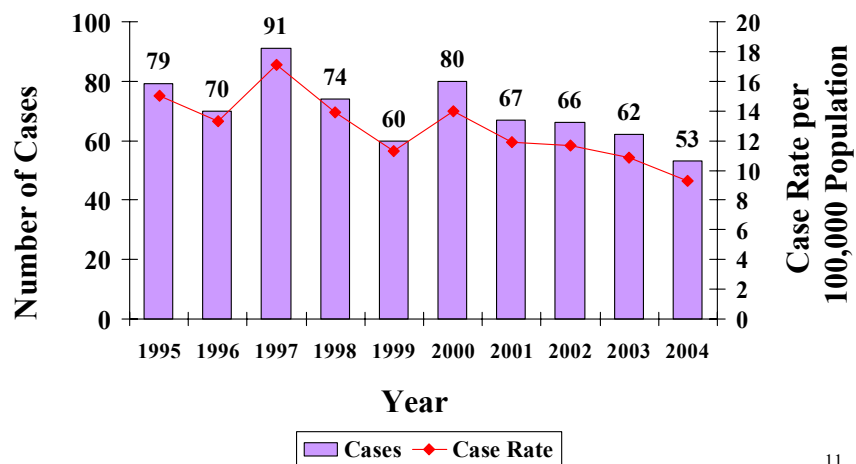
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Tuberculosis Cases and Case Rates Mid-Cumberland Region, 1995-2004



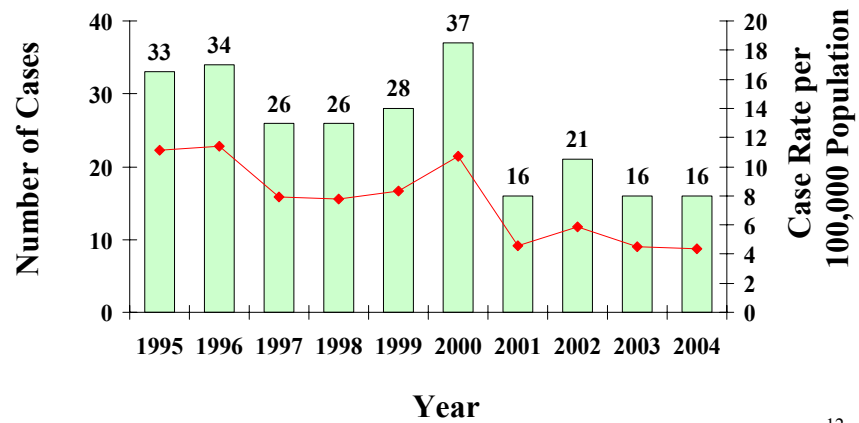
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Tuberculosis Cases and Case Rates Nashville/Davidson County, 1995-2004



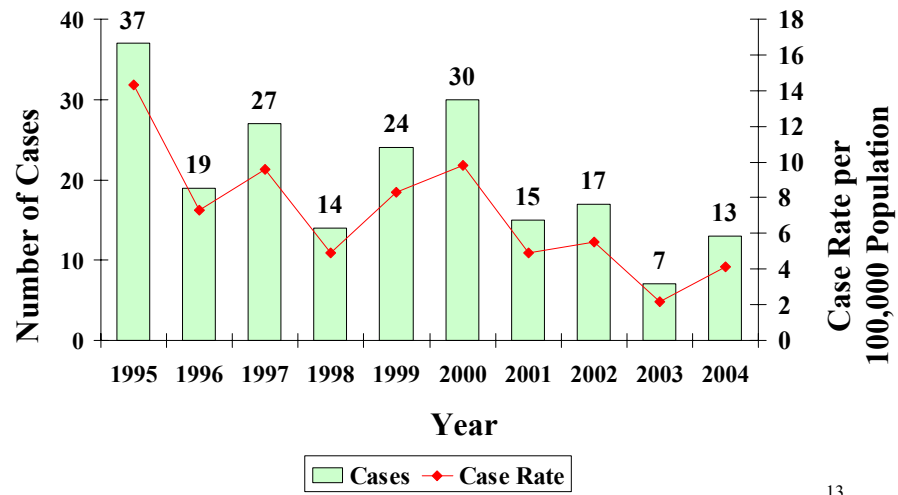
11

Tuberculosis Cases and Case Rates South Central Region, 1995-2004



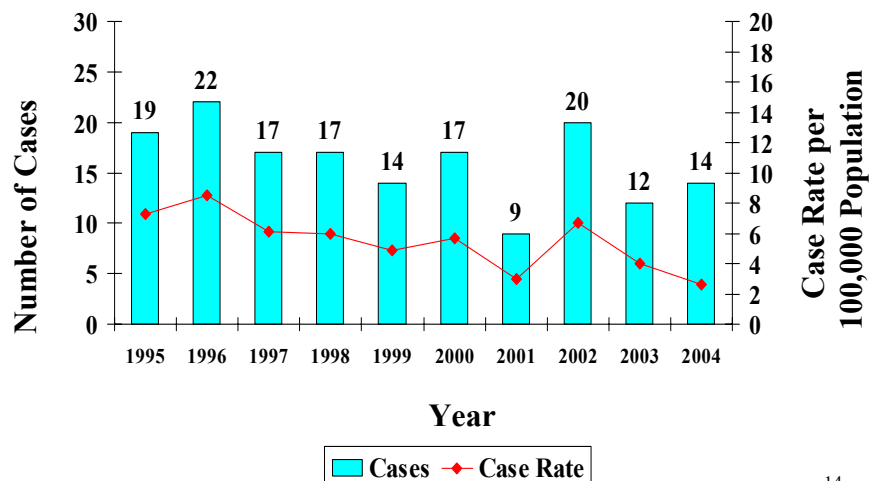
12

Tuberculosis Cases and Case Rates Upper Cumberland Region, 1995-2004



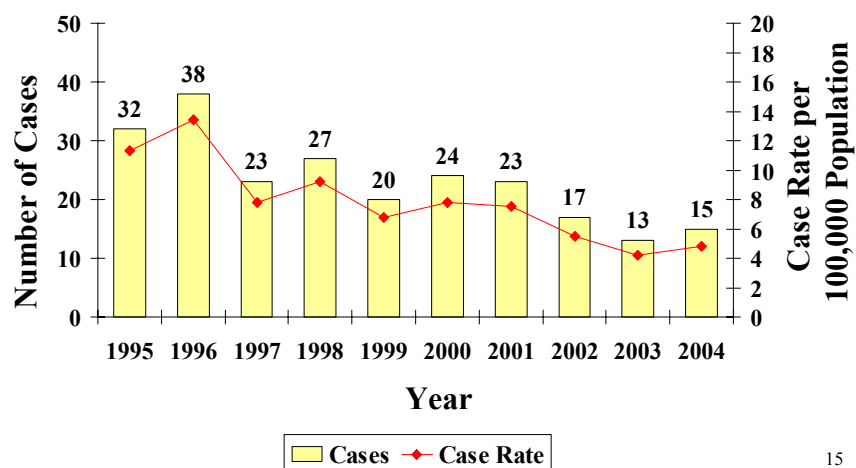
13

Tuberculosis Cases and Case Rates Southeast Region, 1995-2004



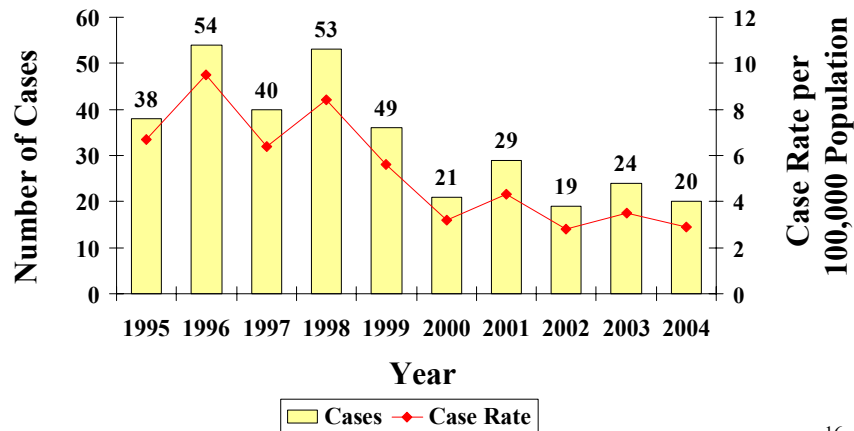
14

Tuberculosis Cases and Case Rates Chattanooga/Hamilton County, 1995-2004



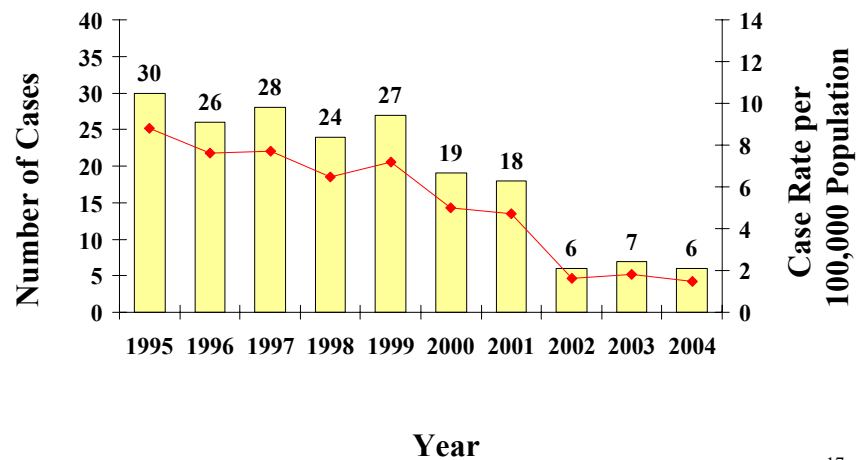
15

Tuberculosis Cases and Case Rates East Tennessee Region, 1995-2004



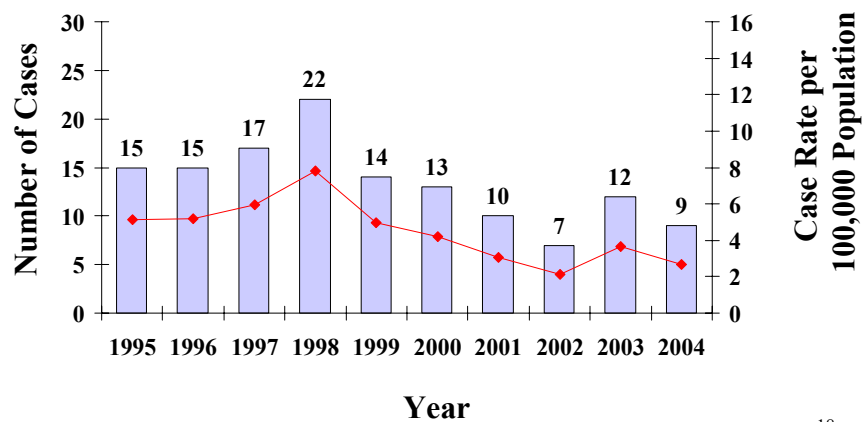
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Tuberculosis Cases and Case Rates Knoxville/Knox County, 1995-2004



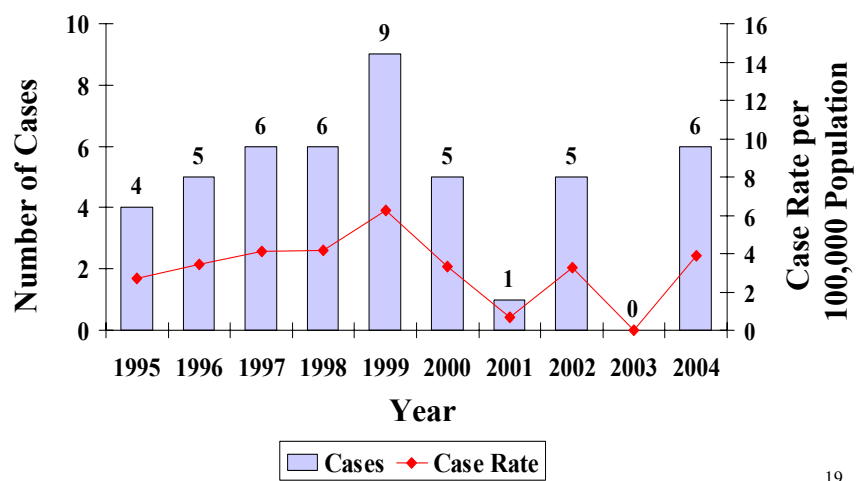
17

Tuberculosis Cases and Case Rates Northeast Region, 1995-2004



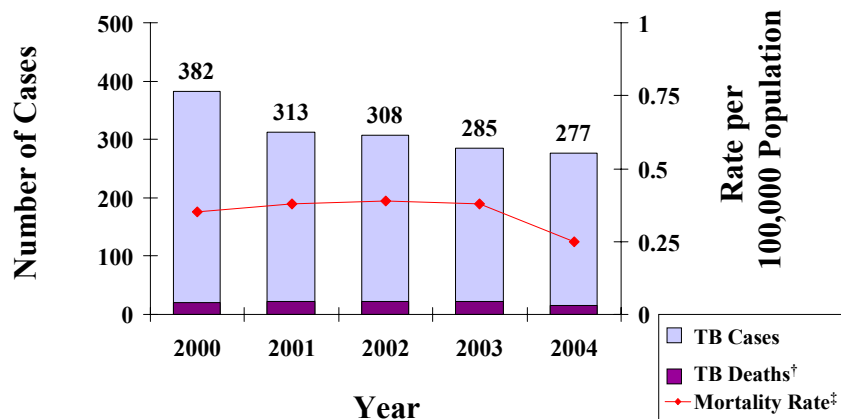
18

Tuberculosis Cases and Case Rates Sullivan County, 1995-2004



19

Tuberculosis Mortality Rates Tennessee, 2000-2004



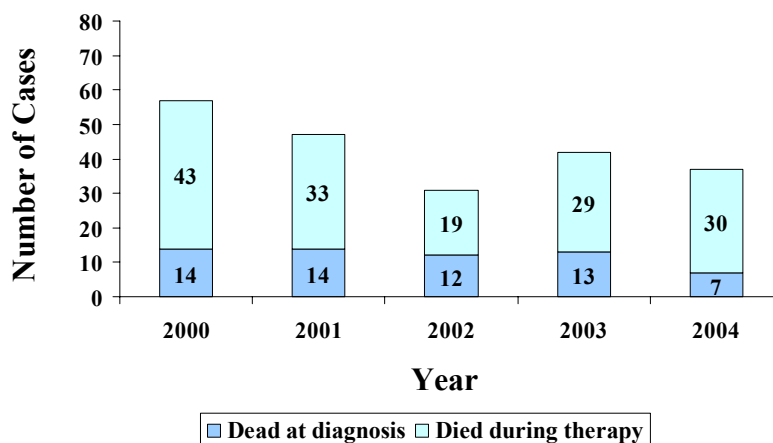
Note: 2004 data are preliminary.

[†]Includes cases where TB specified on death certificate as cause of death.

[‡]TB deaths per Tennessee's population in specified year.

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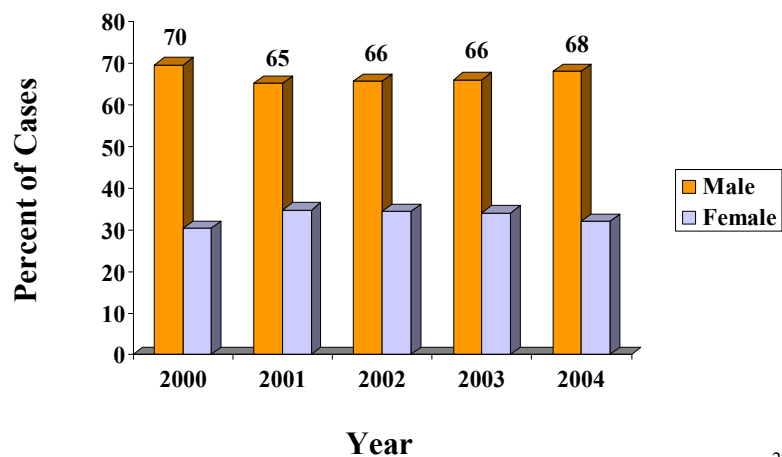
Mortality of Tuberculosis Cases Tennessee, 2000-2004



Note: 2004 data are preliminary; Includes all causes of death.

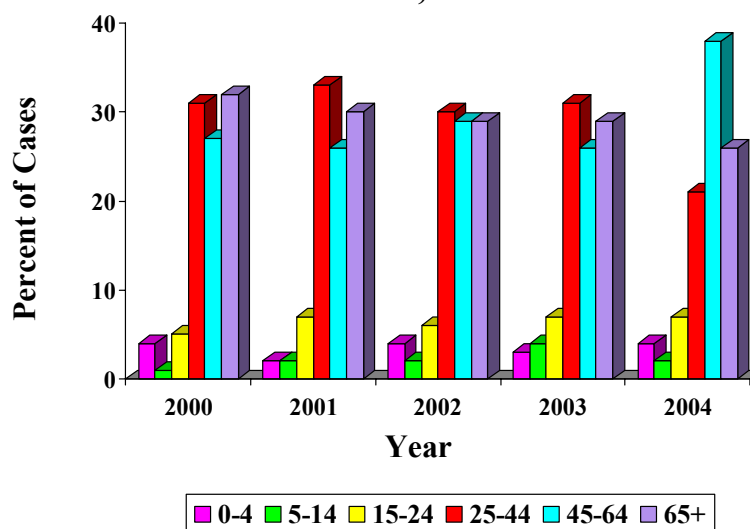
21

Tuberculosis Cases by Gender Tennessee, 2000-2004



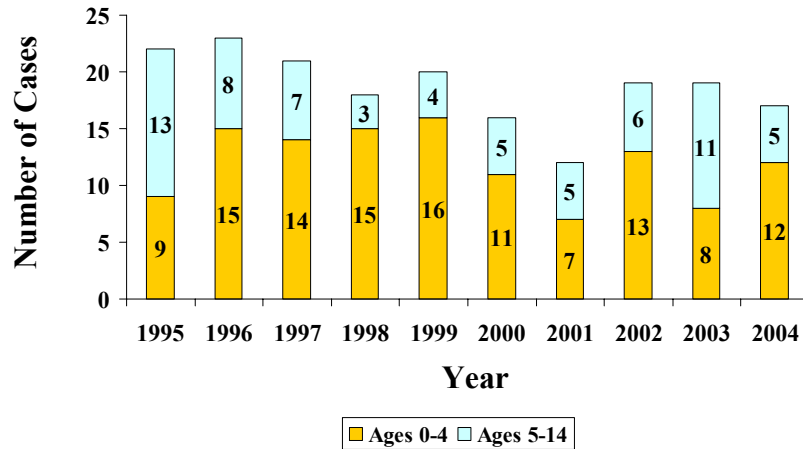
22

Tuberculosis Cases by Age Group Tennessee, 2000-2004



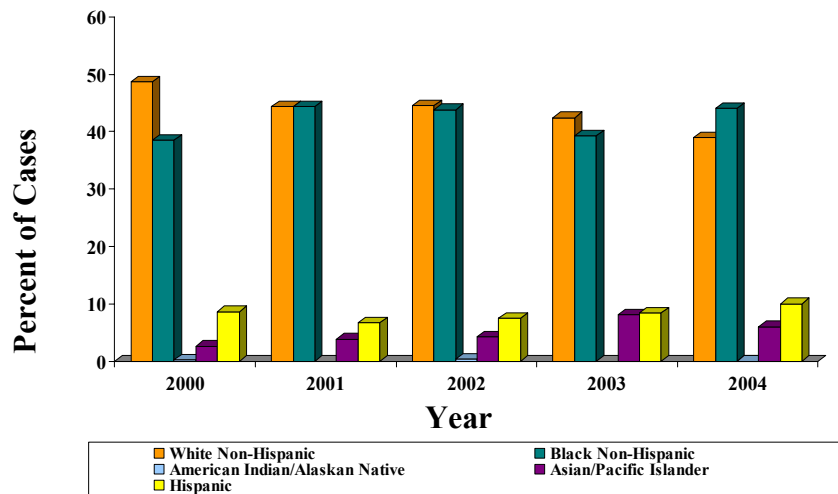
23

Tuberculosis Cases Among Children Aged 0 to 14 Years Tennessee, 1995-2004



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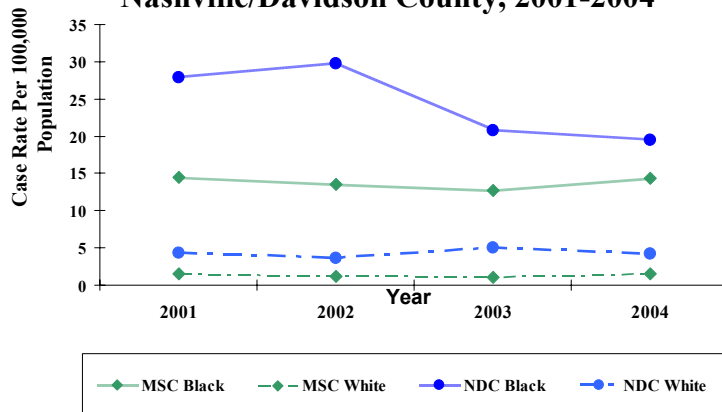
Tuberculosis Cases by Race/Ethnicity Tennessee, 2000-2004



*Data does not include missing information; Race is Non-Hispanic and Hispanic is of all races.

25

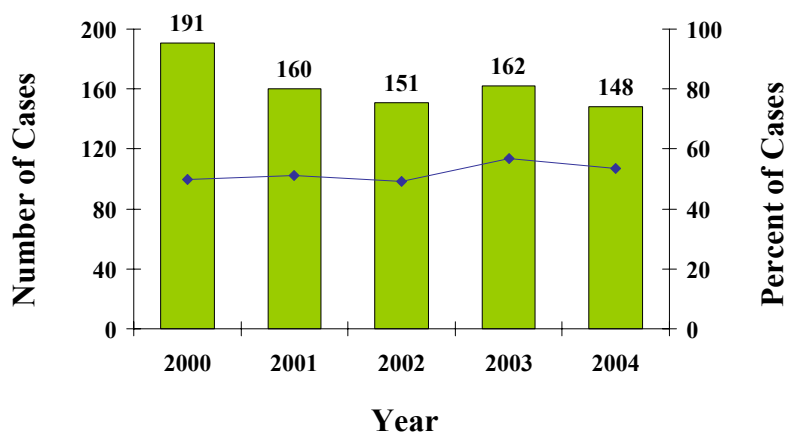
Non-Hispanic White & Non-Hispanic Black Tuberculosis Case Rates Memphis/Shelby County & Nashville/Davidson County, 2001-2004



Population estimates are from the US Census Data and represent estimates at midpoint of each year.
2004 estimates use 2003 population estimates and are preliminary.
MSC=Memphis Shelby County and NDC=Nashville/Davidson County

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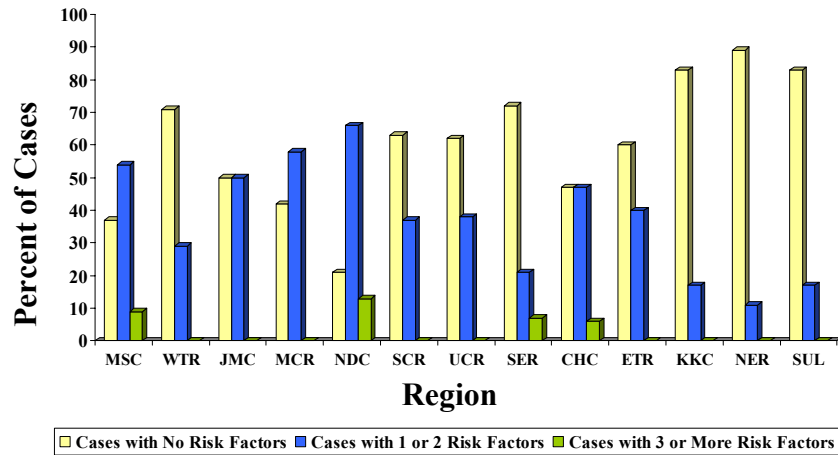
TB Cases with a Known TB Risk Factor Tennessee, 2000-2004



Note: TB risk factors include foreign-birth, HIV co-morbidity, homelessness in year prior to TB diagnosis, resident of correctional facility or long-term care facility at the time of TB diagnosis, injection or non-injection drug use within year prior to TB diagnosis, and excessive alcohol use in year prior to TB diagnosis

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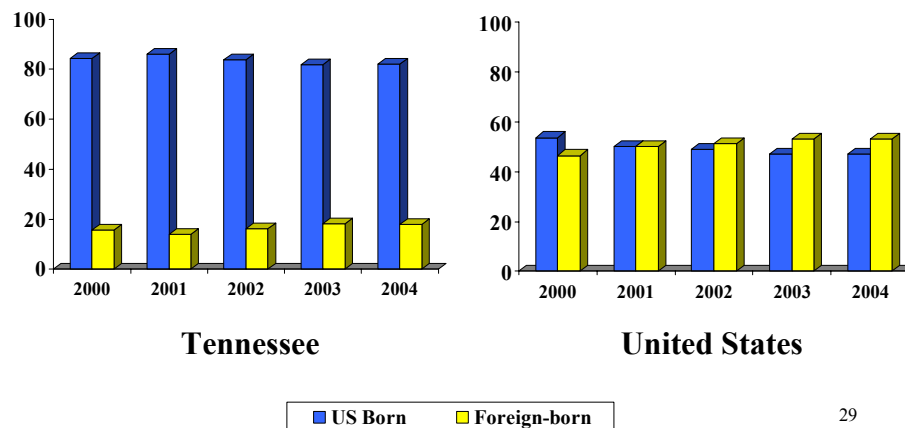
TB Cases with Known TB Risk Factors Tennessee Regions, 2004



Note: TB risk factors include foreign-birth, HIV co-morbidity, homelessness in year prior to TB diagnosis, resident of correctional facility or long-term care facility at the time of TB diagnosis, injection or non-injection drug use within year prior to TB diagnosis, and excessive alcohol use in year prior to TB diagnosis

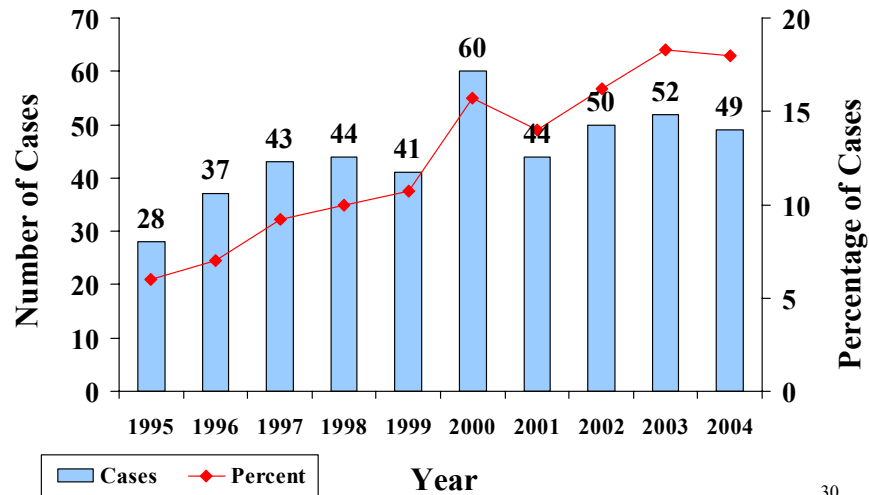
28

Percentage of Foreign-born Tuberculosis Cases Tennessee and United States, 2000 - 2004



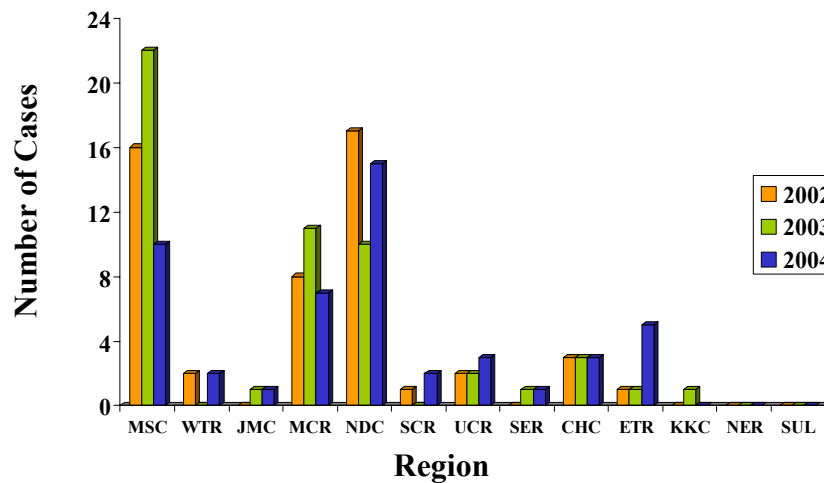
29

Foreign-born Tuberculosis Cases Tennessee, 1995-2004



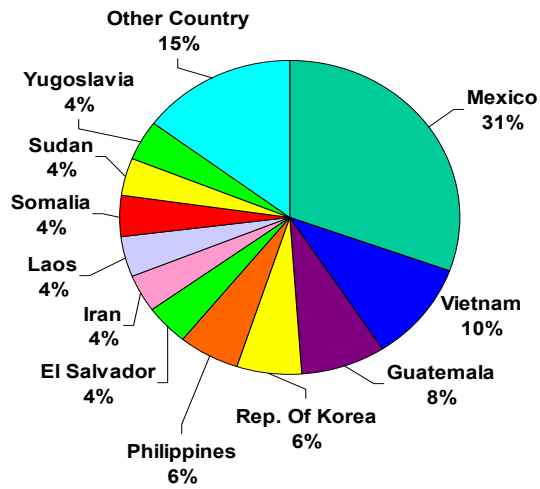
30

Foreign-born Tuberculosis Cases Tennessee Regions, 2002-2004



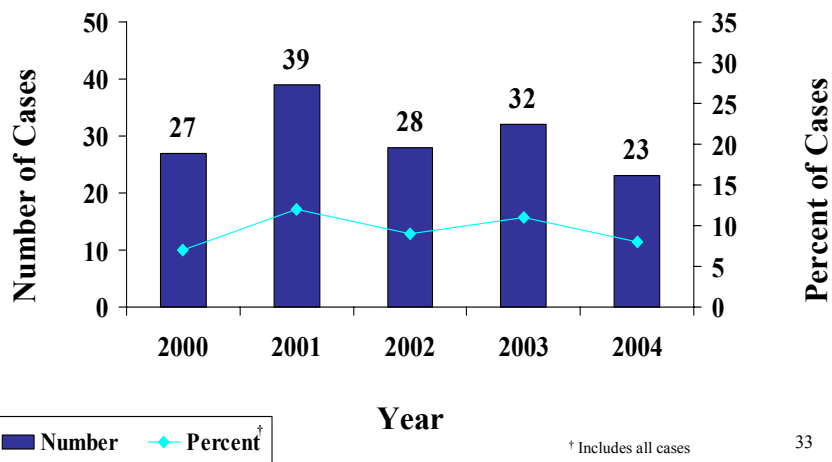
31

Countries of Birth for Foreign-born Tuberculosis Cases Tennessee, 2004



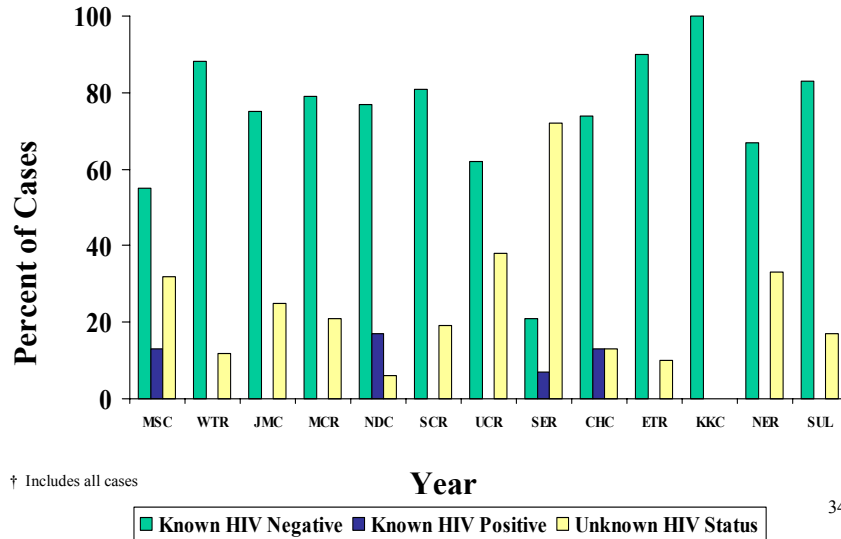
32

Tuberculosis Cases with HIV Co-morbidity Tennessee, 2000-2004



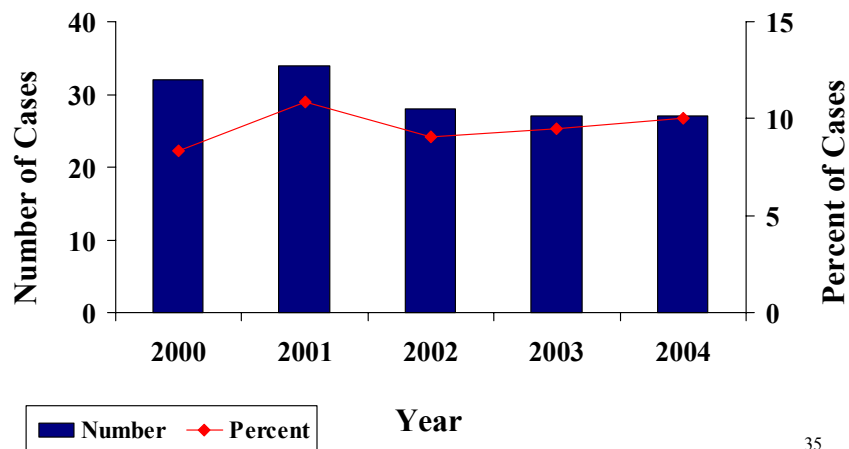
33

Tuberculosis Cases By HIV Status[†] Tennessee Regions, 2004



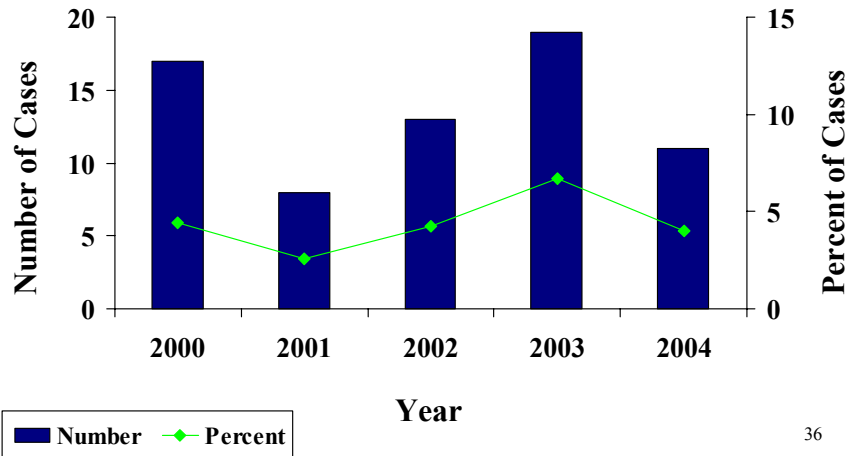
34

Tuberculosis Cases Homeless in Year Prior to Diagnosis Tennessee, 2000-2004



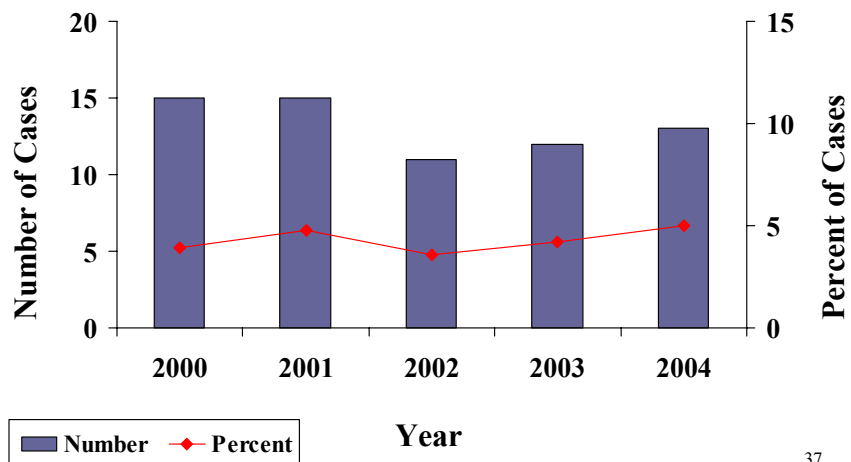
35

Tuberculosis Cases Residing in Correctional Facilities at Diagnosis Tennessee, 2000-2004



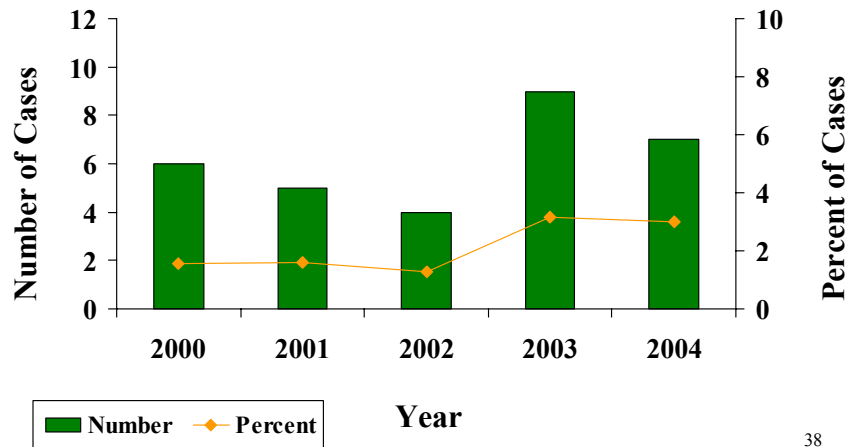
36

Tuberculosis Cases Residing in a Long- Term Care Facilities at Diagnosis Tennessee, 2000-2004



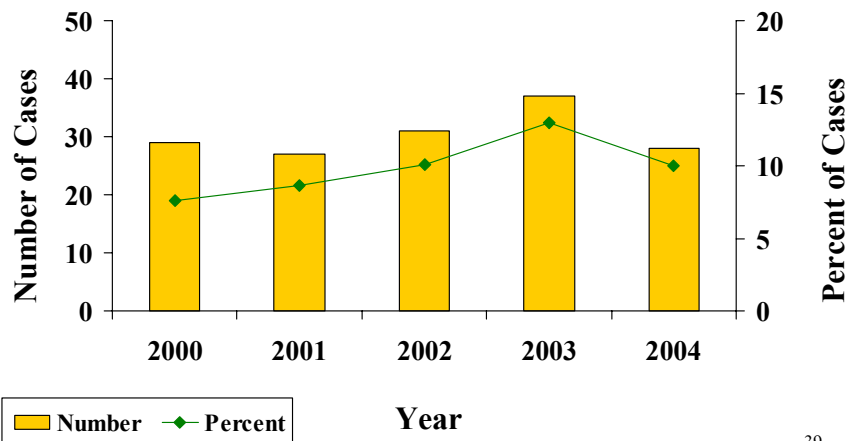
37

Tuberculosis Cases with Injection Drug Use in Year Prior to Diagnosis Tennessee, 2000-2004



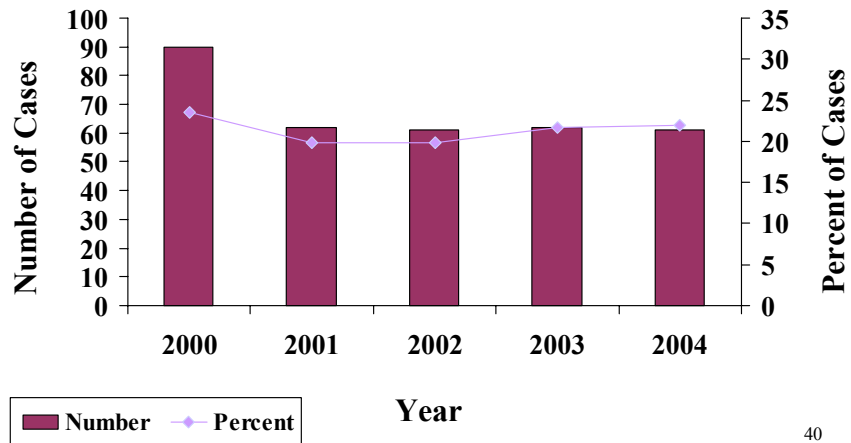
38

Tuberculosis Cases with Non-Injection Drug Use in Year Prior to Diagnosis Tennessee, 2000-2004



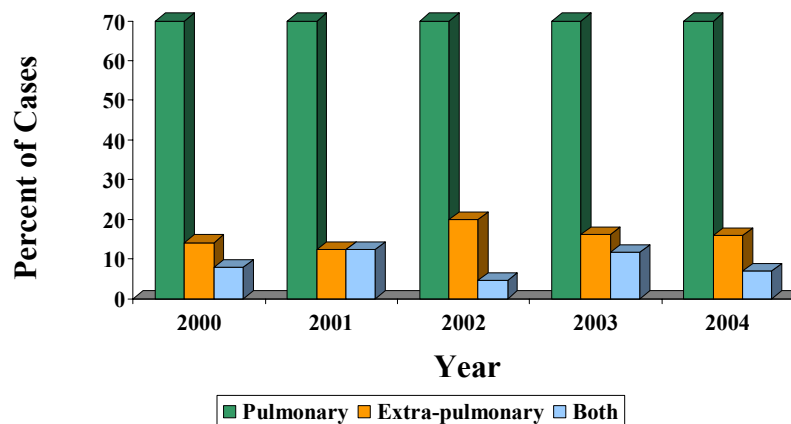
39

Tuberculosis Cases with Excess Alcohol Use in Year Prior to Diagnosis Tennessee, 2000-2004



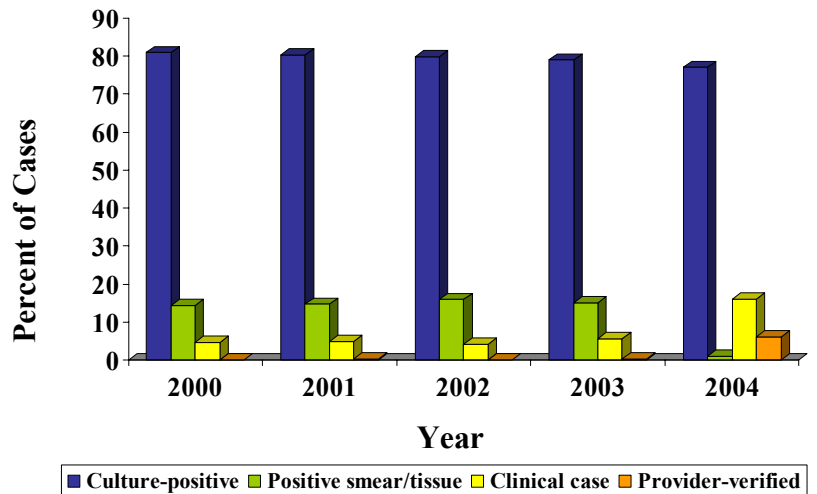
40

Site of Tuberculosis Disease Tennessee, 2000-2004



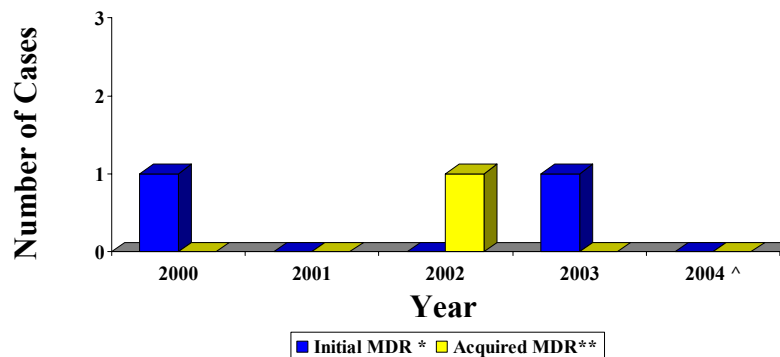
41

Classification of TB Cases Tennessee, 2000-2004



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Multi-Drug Resistance (MDR) of TB Cases Tennessee, 2000-2004



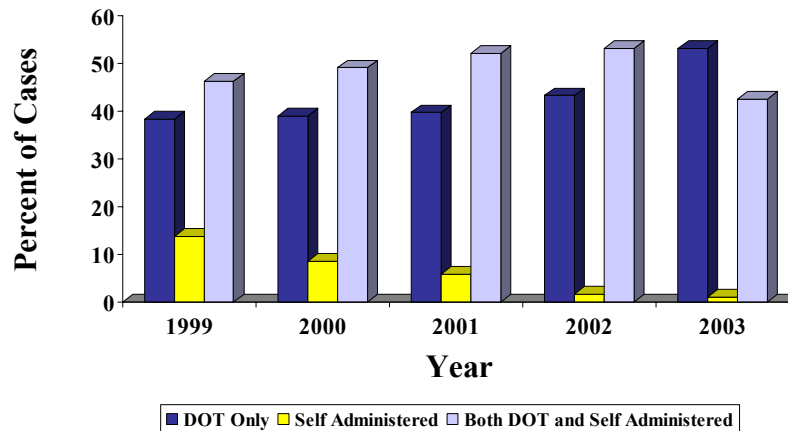
^ 2004 Acquired MDR data is preliminary

* Initial MDR refers to those patients who were culture positive and that had initial drug susceptibility testing and who were found to have TB resistant to both INH and RIF.

** Acquired MDR refers to those patients who were alive at diagnosis and developed MDR TB, who were not initially found to have MDR TB.

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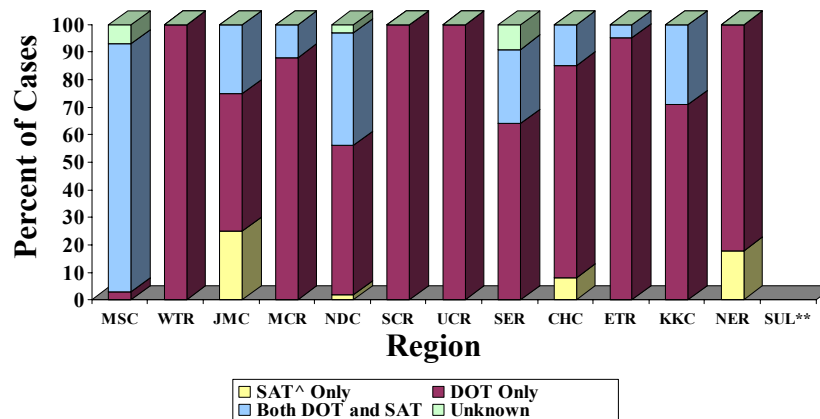
Tuberculosis Cases by Use of Directly Observed Therapy (DOT) Tennessee, 1999-2003



*Data do not include missing information; Therapy information is reported in the year after being counted due to the length of TB treatment.

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Tuberculosis Cases by Use of Directly Observed Therapy (DOT) Tennessee Regions, 2003*



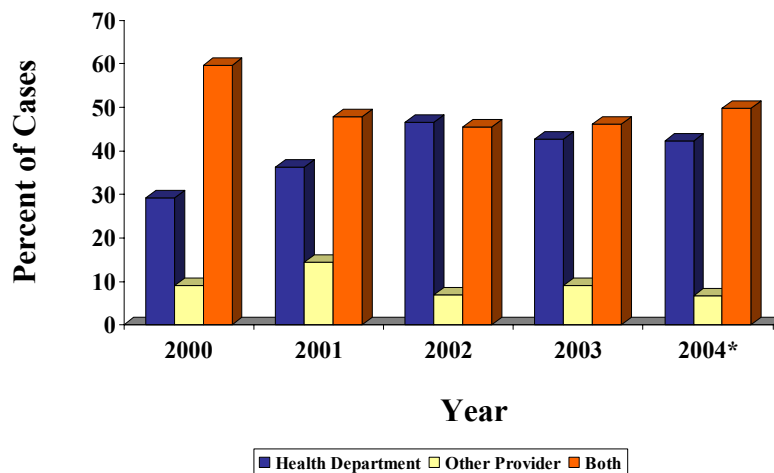
^ SAT refers to Self Administered Therapy

*Therapy information is reported in the year after being counted due to the length of TB treatment.

**Sullivan county reported having no counted cases in 2003

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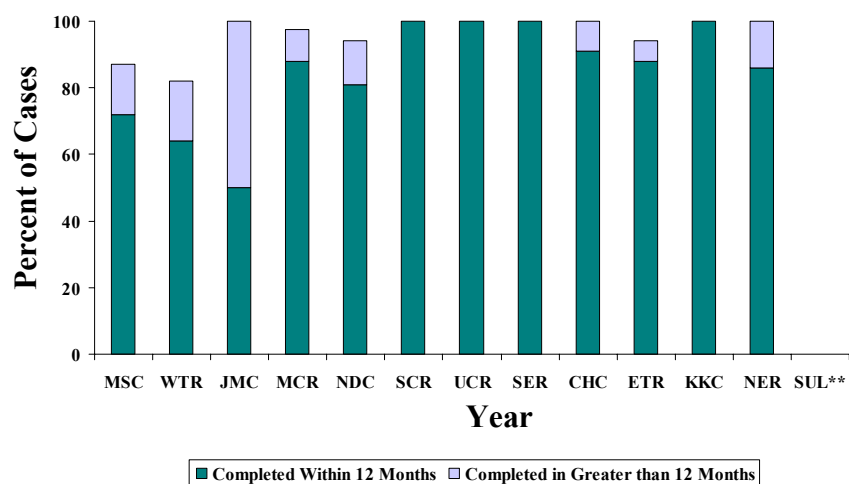
Primary Tuberculosis Medical Provider Tennessee, 2000-2004



* 2004 data are preliminary and do not include missing data

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Tuberculosis Treatment Completion Tennessee Regions, 2003*



*Therapy information is reported in the year after being counted due to the length of TB treatment.

** Sullivan county reported having no counted cases in 2003.

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